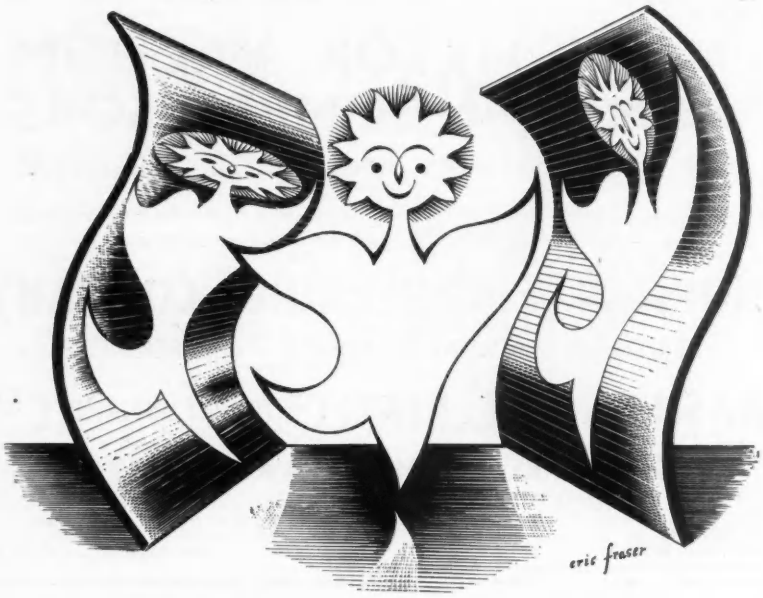
The Chemical Age

VOL LXIII 30 DECEMBER 1950 No 1642

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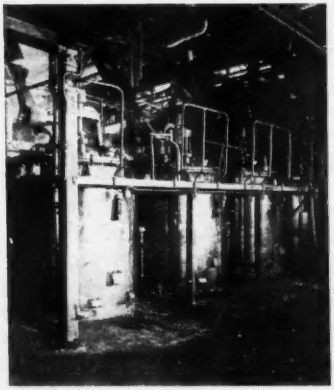

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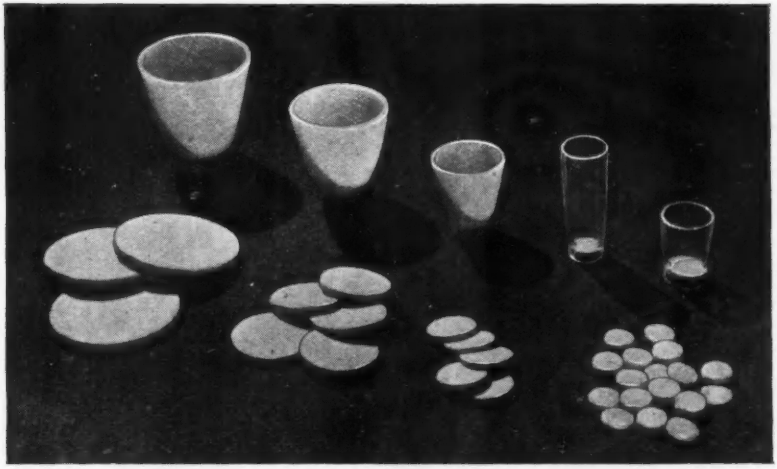

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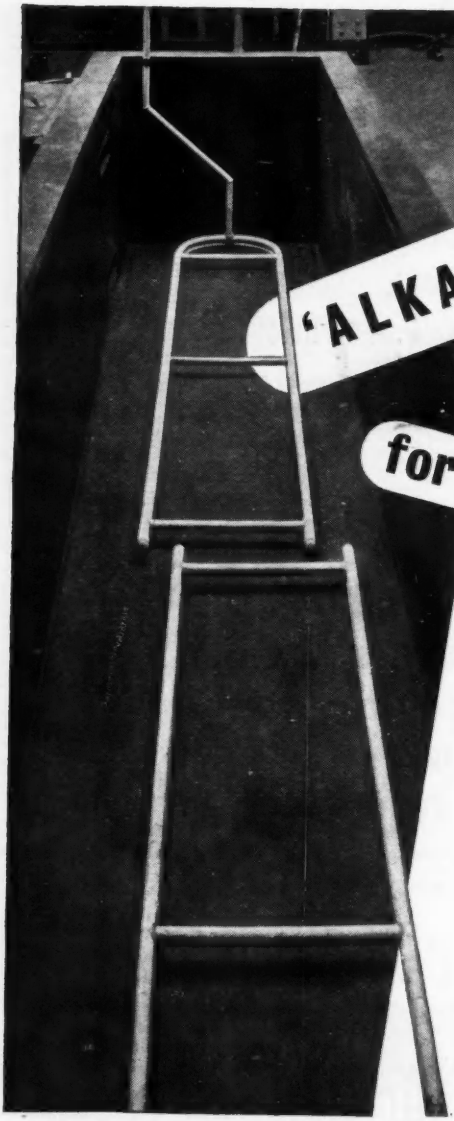

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IMPERIAL CHEMICAL INDUSTRIES LIMITED, LONDON, S.W.1.

P.417

The
# Chemical Age

*The Weekly Journal of Chemical Engineering and Industrial Chemistry*

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## Notes and Comments

### The Coming Year

THE year 1949 ended on a bright note. Recovery from the ravages of war was rapidly becoming manifest and production was expanding. A more plentiful supply of goods reflected the return to better health of many industries, including—despite some shortages—the chemical industry. Now 1950 is almost ended and the outlook is not so good. Since Korea, the effect of the international situation has been to aim a crippling blow at British economic and industrial recovery. Zinc, sulphur, copper, rubber, tin, glycerin, solvents, and many other essential raw materials threaten shortly to become, if not very scarce, then at least morbidly expensive. Expansions are being shelved, progress inhibited and the cost of living increased by new shortages being thrust upon us by distant events. It is to be hoped that 1951 will not prove as difficult as many predict it may, but there is little doubt that it will prove less easy than the year which is rapidly slipping by. THE CHEMICAL AGE, however, wishes all its friends a most happy and prosperous 1951.

### Exports Records and the Future

CHEMICAL exports in November achieved a new high level of over £11 million, which should assure the easy attainment this year of the estimate of the Economic Survey. Much of this success is due to improvement of trade within the Commonwealth. Canadian and Australian shipments were nearly doubled in value compared with the same month of last year and the Indian and Pakistan markets steadily developed. A remarkable feature was the continued increase of sales to the U.S.A. with a total of £1,185,441, more than four times the 1949 figure. Some of this November achievement must, of course, be attributed to the rising costs of raw materials. How far the level of chemical exports will be able to be maintained next year is a serious problem. Shortages of raw materials are bound to have an adverse effect. The world scarcity of sulphur has, indeed, begun to be felt in many directions. One chemical firm has already reported a reduction of its main export, lactic acid, due to this shortage.

### The Blow Falls

NO news (it is often said) is good news, but we disagree. Until the recent pronouncement by the U.S. Department of Commerce that 200,000 tons of crude sulphur would be exported from that country in the first quarter of 1951, there was a hope—however forlorn—that Great Britain would not be too

badly hit by any reduction in sulphur supplies. Now we know how much we are going to get—81,645 tons. True, it might have been worse. At one time, the gloomy view held sway that a 50 per cent cut was likely in 1951. At least that pessimistic prediction has not been fulfilled. But 81,645 tons represents a cut back of about 30 per cent on the quality really required. At present, over 38,000 tons is needed every month by the multifarious users in the U.K. From this it seems that Great Britain must scratch around for something like an entire month's supply of sulphur, before the end of March next year. How badly the country's economy will be affected by the shortage cannot, however, be directly assessed from these figures. Some fertilisers, which in the past have been made in this country, are now being imported. This will relieve some of the burden on the sulphuric acid industry, but there are numerous other industries to which sulphur is absolutely essential. It is to be hoped, therefore, that some efficient system of priorities will be used so as to ensure that, wherever possible, those manufacturers who literally cannot carry on without sulphur or sulphuric acid will receive sufficient for their needs.

## MOBILE FACTORY ON VIEW

THE acute shortage of metal containers lends particular interest to an exhibit at the second National Packaging Exhibition to be held at Olympia, London, from 30 January to 9 February.

One firm has taken the entire ground floor of the Empire Hall for a single exhibit—probably the largest ever shown indoors in Britain. This is to be a complete mobile metal drum-making factory.

The mobile unit has been created to meet the special needs of petroleum, oil and similar large companies working in undeveloped areas of the world. Hitherto they have had to undertake the somewhat expensive process of (a) constructing a pipeline or (b) operating a fleet of tankers to bring the oil back to civilisation. If these methods were impracticable, then they had to resort to the shipping from Britain of empty drums—which meant paying heavy freight charges for what in effect was nothing more than "packaged air."

A mobile factory of this nature makes that unnecessary. It is complete in every sense of the word, with plant, and equipment for producing painted and printed drums from flat sheet, together with a mobile cinema, a canteen (able to serve 400 meals an hour), and sleeping and recreation quarters for the operatives.

A special team of British workers has been trained to man the mobile factory.

# On Other Pages



**The annual subscription to THE CHEMICAL AGE is 30s. single copies, 9d.; post paid, 1s.; SCOTTISH OFFICE: 116 Hope Street, Glasgow (Central 3970). MIDLANDS OFFICE: Daimler House, Paradise Street, Birmingham (Midland 0784-5). THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers, Limited.**

# SULPHUR CONSUMPTION RESTRICTED

## *Rationing to be Introduced from 8 January*

THE Board of Trade has announced that because of the reduction in the export of United States sulphur to this country it will be necessary to restrict consumption. From 8 January rationing will be introduced for the distribution of sulphuric acid and crude and processed sulphur.

The manufacture of sulphuric acid from raw materials other than sulphur will not be affected, but the distribution of all acid produced "will have to be controlled in the interest of the national economy."

Two Orders have been made which prohibit from 8 January next, except under licence of the Board, the supply of sulphuric acid and the supply of crude sulphur which has been recovered by any industrial process; or of processed sulphur.

Processed sulphur is described as flowers of sulphur, roll sulphur, or sulphur which has been subjected to any one or more of the processes of grinding, precipitating, and refining. The supply of processed sulphur in quantities not exceeding 56 lb. in any one month is not affected.

The Orders, which were published on 29 December, are the Control of Sulphuric Acid Order, 1950, and the Control of Sulphur Order, 1950.

### Farmers Worried

The cut in sulphur supplies and the shortage of superphosphates for British agriculture were discussed 21 December at a Press conference in London after a meeting of the council of the National Farmers' Union. Mr. H. N. Palethorpe, chairman of the commercial committee, said that although he had heard unofficially that the Government had undertaken to obtain the 300,000 tons of superphosphates required this year from the Continent he was worried about the position next year if the cut in supplies from America was to be permanent

A supplementary consignment of 100,000 tons which America had supplied this year was for all industries, and the amount being supplied to OEEC countries had been drastically cut. A little sulphur was obtainable from Italy but it was difficult to get and was expensive. Next year the European countries would need all the superphosphates they could produce for their own use.

An alternative source of sulphuric acid was pyrites, of which there was an ample supply in Spain, and if the cut in supplies from America was to be permanent some consideration must be given quickly to the establishment of plant for making sulphuric acid from pyrites in this country. If farmers were cut off from supplies of superphosphates the fertility of the soil would be seriously affected. Not only potatoes but every farm crop was dependent on some sort of phosphate fertiliser.

## American Sulphur Exports

QUOTAS for the amount of sulphur which may be shipped to foreign destinations during the first quarter of 1951 have been announced by the U.S. Department of Commerce.

The over-all total for export licensing was fixed at 200,000 long tons of crude sulphur and 7500 tons of refined sulphur. Individual quotas of crude sulphur for various European countries (in long tons) include: Great Britain, 81,465; France, 20,125; Germany, 3000; Switzerland, 3000.

Britain has been importing sulphur at the rate of 360,000 tons a year for acid making, and 95,000 tons for other uses. The U.S. quota means a cut of from 25 to 33⅓ per cent on the U.K. requirements.

While this allocation was about what was expected as a result of the recent Washington discussions, it represents the barest minimum needs and considerable hardships will be involved.

Among the various applications of sulphur are vulcanising rubber, hop farming, and medical and pharmaceutical products. A large amount of sulphur and sulphuric acid is also used in the viscose rayon trade.

Australia and New Zealand at present hold large stocks and are suffering sharp cuts in their supplies. It is expected, however, that their quotas will be increased later in 1951.

Production of sulphur in America is about five million tons a year, of which 1.5 million tons has been exported.

### Quicksilver Dearer

The price of quicksilver in London rose sharply on 20 December to £42 10s.-£43 per flask compared with £37-£38 previously. This reflected a rise in prices at the source, Spanish quicksilver having been increased by $15 to $115 f.o.b.

# URANIUM FROM GOLD MINES

## *South African Supplies for Britain and U.S.A.*

URANIUM from South African gold mines, which constitute one of the world's biggest known sources, is to be made available to the British and American governments. An agreement to this effect has been made between the three countries following talks held recently in Johannesburg.

This agreement, announced by the Ministry of Supply, brings to a successful end several years of intensive research and development, in which all three countries have taken part, on the problem of making recovery of uranium from South African gold ores an economic proposition. Although there is not a large percentage of uranium in this ore, so much is mined that the total amount available will be relatively large, and the operation becomes economically possible because the gold "tailings" (ore from which the gold has been extracted) are in most cases a waste product.

Four mining companies will be responsible for initial production. These are: West Rand Consolidated Mines, Ltd.; Daggafontein Mines, Ltd.; Blyvooruitzicht Gold Mining Co., Ltd.; Western Reefs Exploration and Development Co., Ltd.

### Additional Plants Possible

Consideration will be given to the construction of additional uranium plants on other mines if required. Ultimately, South Africa may become one of the world's most important uranium producers.

Although uranium will be an additional product, the revenue and earnings from it will not be on such a scale as to affect materially the financial position of the companies concerned.

The Johannesburg negotiations were between representatives of the South African Atomic Energy Board, which includes leading members of the gold mining industry, and representatives of the United Kingdom and the United States. Preliminary discussions were held in the same city a year ago.

Design and construction of the necessary plant are proceeding as a matter of urgency. Owing to security considerations, information on certain parts of the programme cannot be made public.

The board of West Rand Consolidated Mines, Ltd., announces that by an arrangement with the Atomic Energy Board of South Africa it will erect a plant for the extraction of uranium from the gold residue slimes of the 40,000 tons monthly capacity of the West Reduction Plant at present under construction.

This plant will be used for the treatment of ore mined from the Bird Reef series, which ore body contains uranium in quantities considerably in excess of the contents of the other reefs in the mine.

It is estimated that the plant will be ready for operation in the latter part of 1952, and the contract with the board will be for the sale of uranium over a period of 10 years from the time the plant is in full production.

### A Reasonable Profit

The price payable for the uranium will be related to the cost of production on a basis which will ensure the redemption of the capital cost of the plant, plus interest, over the 10-year period of production, and should provide a reasonable margin of profit to the company on the capital invested.

Arrangements have been made through the Atomic Energy Board whereby the company can obtain a loan of the entire capital cost of the plant, such loan being repayable during the 10-year production period. It will therefore be unnecessary to call upon shareholders to provide any of the finance required.

The agreement with the Atomic Energy Board provides that the company must pay to the State a proportion of its profits from uranium at the same rate applicable to the profits obtained from mining for gold. It is estimated that on the present basis of taxation and costs the net profit accruing to the company will be of the order of 9d. to 1s. an ordinary share per annum on the existing capital of the company.

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## Nickel Prices Higher

The International Nickel Company of Canada, Ltd., and its associated companies, the International Nickel Company, Inc., of the U.S.A., and The Mond Nickel Co., Ltd., in the United Kingdom, have announced that their prices for refined nickel are being increased immediately. The Mond Nickel Company is raising its price in the U.K. to £406 per ton delivered works, with appropriate increases for other countries.

# WORLD PRODUCTION OF FERTILISERS

AN outline of the world position in the production and use of fertilisers, and the impressive share of the Commonwealth, both in output and trade, as well as of recent developments in individual Commonwealth countries, is given in a report recently published by the Commonwealth Economic Committee, entitled *Survey of Trade in Fertilizers*.

The survey shows that world usage of chemical fertilisers had by 1948-49 risen to record levels, and that world production was well above pre-war figures. Several Commonwealth countries had expanded their production of various types of fertilisers and others had plans in hand for a considerable increase.

## Consumption Greatly Increased

There has been a very substantial rise in the use of fertilisers—by 1949, nitrogen consumption increased to 37 per cent above the pre-war figure, phosphate to 44 per cent and potash to 40 per cent. The Commonwealth consumes about 10 per cent of the world total of nitrogen, and about 20 per cent of the world total of phosphate.

*Nitrogen.*

In 1938-39 the world output of nitrogen was 2.5 million tons. There was a sharp decrease during the war, followed by a heavy increase, the world total reaching 3.3 million tons in 1948-49, an increase of 30 per cent over the pre-war figure.

## More Than Doubled

Between 1938-39 and 1948-49, output in the Commonwealth rose two-and-a-half times, and represented 14 per cent of the world total as compared with 7 per cent before the war. While the United Kingdom was responsible for the greater part of the Commonwealth output, and Canada for most of the remainder, production in both Australia and India is increasing rapidly.

*Phosphate.*

Before the war, the world output of phosphate rock was estimated at 13 million tons; in 1946-47 it was 17 million tons, rising to 19 million tons by 1948-49. Although little exploitable rock is found in most Commonwealth countries, the deposits on Christmas Island, and the Pacific islands of Ocean and Nauru provided (pre-war) 10 per cent of the total, or 1.3 million tons.

World production of manufactured phosphate was estimated at 5 million tons (on the basis of phosphorus pentoxide content, *i.e.*, $P_2O_5$) in 1948-49, as compared with 3.5 million tons in 1938. Before the war, the Commonwealth contributed about 15 per cent of the total, and nearly 20 per cent thereafter, mainly in the form of superphosphate production in the United Kingdom, Australia and New Zealand. In terms of $P_2O_5$, Commonwealth output rose by about 85 per cent from 1938 to 1948-49, all countries showing substantial increases.

*Potash.*

Estimated production of potash for fertiliser purposes was 3.2 million tons in 1948-49 as compared with 2.7 million tons in 1938 (both figures exclude the U.S.S.R.). The Commonwealth produces only minute quantities in Australia and South Africa, but some expansion is anticipated in Australia.

## Trade in Nitrogen

*Nitrogen.*

Total trade in nitrogen recovered fairly rapidly from war-time reductions, and in 1949 it was 25 per cent higher than in 1938.

The Commonwealth is a large net exporter of nitrogen on a considerably larger scale than before the war—shipments from the United Kingdom and Canada exceeding total imports into Commonwealth countries. Shipments from the Commonwealth in 1949 amounted to nearly 20 per cent of the world total, well over twice as much as was imported into Commonwealth countries.

ESTIMATED TRADE IN NITROGENOUS FERTILISERS
*Nitrogen content (thousand tons)*

| | 1938 | 1949 |
|---|---|---|
| World total *Imports* ... ... | 748 | 908 |
| of which Commonwealth ... | 53 | 64 |
| World total *Exports* ... ... | 753 | 961 |
| of which Commonwealth ... | 114 | 187 |

* Excludes U.S.S.R.

*Phosphate.*

World trade in phosphate recovered rapidly after the war, and by 1949 it was about one-third higher than before the war. In this case the Commonwealth is a net importer, taking nearly twice as much as before the war and about one-third of world exports. In 1949, the Commonwealth accounted for 36 per cent of total imports, and 16 per cent of total exports.

*Potash.*

The production of potash (mainly an

export of France, Germany and Spain) fell seriously during the war, but by 1948 had recovered to the pre-war level, and by 1949 had shown an advance estimated at about 30 per cent.

The Commonwealth does not export potash, but imports more than twice as much as before the war, nearly 25 per cent of the world's total in 1949.

### Net Trade Position

Broadly speaking, the Commonwealth is a net exporter of nitrogen, but an importer of phosphate and potash. In 1948-49 only two Commonwealth countries, the United Kingdom and Canada, exported nitrogen in significant quantities; India was the largest importer, followed by the Colonial territories. All Commonwealth countries imported phosphate, but the very large exports of ammonium phosphate from Canada together equalled about a third of the Commonwealth's total imports. The principal importer of potash was the United Kingdom; Canada took most of the remainder; no Commonwealth countries exported potash in significant quantities.

In 1948 the total value of fertiliser imports into Commonwealth countries, other than Colonial territories, was £26.8 million, and of exports £17.9 million (after taking account of exports of phosphate rock from Nauru, Ocean and Christmas Islands to Australia and New Zealand of about £1.5 million), giving a net import balance of £8.9 million. The United Kingdom took 52 per cent of the imports, mainly in the form of potash, rock phosphate and superphosphate, India took 14 per cent, Canada 9 per cent, Australia 7 per cent, New Zealand and South Africa 6 per cent each, and Ceylon 5 per cent. Canada was the principal exporter with 50 per cent of the total, followed by the United Kingdom with 38 per cent.

### Recent Developments

*Canada.*

The fertiliser industry is becoming increasingly important in Canada. Total consumption in terms of plant nutrients increased heavily during the war and has continued to rise. Exports and imports have increased since 1938. Fertilisers have become a moderately important item of the total value of Canadian exports; the United States is the principal customer and the principal source of the imports.

*Australia.*

Apart from comparatively small quantities of ammonium sulphate and slag, the output of chemical fertilisers in Australia is almost entirely of superphosphate made by treating imported rock phosphate with domestically produced sulphuric acid. Before the war Australia's phosphate rock requirements were met almost entirely from the British Phosphate Commission's workings on Ocean and Nauru Islands, and this supply, interrupted during the war, has now been resumed. Indigenous rock was mined during the period 1941-45, but the quantities were small and the quality poor. Increasing amounts of sulphate of ammonia are being produced at government synthetic ammonia plants.

The expansion of the Australian fertiliser and chemical industries, which in some branches has been very marked, is expected to continue. Domestic production of ammonium sulphate is expected soon to be sufficient for requirements, and may also serve ultimately to reduce the demand for imported sodium nitrate. Supplies of potassic fertilisers are sufficient to meet requirements. The projected expansion of phosphate rock production by the British Phosphate Commission is expected to be ample to meet increased future demand; local production of sulphuric acid is also being greatly expanded.

### New Zealand Recovery

*New Zealand.*

Production of fertilisers in New Zealand, which is mainly in the form of the manufacture of superphosphates from imported rock phosphate, recovered by 1946 from the low levels to which it had sunk during the war and it has since continued to rise. In normal times, the rock phosphate supplies are obtained almost entirely from Ocean and Nauru Islands, and since output there has been resumed, requirements are again being met.

Important plans for developing New Zealand's hill country, announced in 1949, included the provision of special aircraft for top-dressing and the erection of new fertiliser works. The New Zealand Meat Producers' Board has expressed its willingness to lend, from accumulated stabilisation funds, a substantial part of the capital necessary for the erection of a new co-operative works.

*South Africa.*

Production of fertilisers in South Africa is principally in the form of superphosphate from imported rock and both indigenous and imported sulphur; some rock phosphate is mined but no potash. South Africa is primarily an importer of phosphates; exports are small—mainly of superphosphate to Southern Rhodesia—

5000 tons before the war, rising to 22,000 tons in 1948. Superphosphate production is being increased, and extensions are in hand at two plants near Durban and Capetown, which will mean a considerable increase in capacity.

*India.*

The principal chemical fertiliser used in India is ammonium sulphate, of which a quarter was domestically produced and three quarters imported in 1949. Average imports in the four years 1946-49 were about 75 per cent higher than before the war. The United Kingdom supplied nearly all the ammonium sulphate in 1946, but this share declined to one-third of the total by 1949. During 1949 special arrangements were made for the import of about 400,000 tons of ammonium sulphate for delivery during the two years 1949-50 to meet the requirements of the "Grow More Food" campaign. Sodium nitrate, insignificant until 1946, rose in three years to one-sixth of the total; imports of phosphates also rose.

### In Production Soon

Before the war, India produced very little in the way of artificial fertilisers of any kind, but imported substantial quantities, particularly of ammonium sulphate. In 1943 the Foodgrains Policy Committee estimated that India (undivided) would require at least two million tons of artificial fertilisers a year and recommended that, as a first step, immediate action should be taken to establish production of nitrogenous fertilisers at the rate of 350,000 tons a year. Investigations were put in hand, and in 1944 a technical mission from the United Kingdom reported upon the problem. The Government of India decided to erect at Sindri in Bihar, a large plant with an ultimate capacity of 350,000 tons of sulphate of ammonia a year. Production is expected to commence early in 1951, at about 100,000 tons a year, rising to the target figure in three or four years. The Government of Mysore has contracted for the construction of a fertiliser plant at Bhadravali with an annual production of 25,000 tons of ammonium sulphate and 25,000 tons of superphosphate. Production should begin in two years.

*Pakistan.*

General development schemes for bringing more land under cultivation and raising production levels are under way in Pakistan. Price and lack of knowledge have in the past been the reasons for the small use of fertilisers, but several provincial Governments have started schemes for subsidising the use of ammonium sulphate and for educating farmers by demonstration and publicity. The United Kingdom is the principal supplier of ammonium sulphate. The necessary raw materials for its manufacture are available in Pakistan, however, and the Government is considering a scheme for establishment of a large plant in West Pakistan.

*Ceylon.*

Ceylon is not yet a producer of chemical fertilisers, but progress is being made toward the setting up of a nitrogen industry, and the manufacture of nitrogenous fertilisers.

*Southern Rhodesia.*

Southern Rhodesia does not produce chemical fertilisers in appreciable quantities. Two factories make fertiliser mixtures from imported raw materials, part of this production being exported to Northern Rhodesia and Nyasaland. Southern Rhodesia imports a small amount of chemical fertilisers, chiefly superphosphates from South Africa.

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## *IN THE EDITOR'S POST*

### Attacking the Tower

SIR,—The leading article in your issue of the 9th instant, refers to the difficulties arising from the complex chemical names of substances now coming into prominence in various fields, to the advisability of using shorter names or symbols and the desirability of an internationally agreed list of simpler names for these materials.

My object in writing is to remind you that, as mentioned in your issue of 2 September 1950, p. 327, serious attempts are being made to meet this situation. It is to be regretted that notwithstanding several press notices, the writer of your leading article does not appear to be aware of the work now being done by the B.S.I. Committee on Nomenclature. The first list of common names for pest control chemicals will be issued shortly, careful consideration having been given to the comments received on the first draft circulated last August. The committee is actively at work on a further list.

I would emphasise that close contact is being maintained with similar official bodies in the United States and in the Commonwealth countries and it is hoped that ultimately international agreement will follow.—Yours faithfully,

H. J. JONES,

Chairman, B.S.I. Committee on Nomenclature of Pest Control Chemicals.

## PROTECTIVE CLOTHING

SOME recent fatalities have drawn attention to the urgent need for providing agricultural workers with satisfactory means of protection against the highly toxic effects of many modern antipest chemicals.

At the request of the National Farmers' Union, James North & Sons Ltd., of Godley Mills, Hyde, Cheshire, manufacturers of North P.V.C. protective clothing and gloves, etc., recently undertook a series of severe tests in their own laboratories to ascertain the degree of protection afforded by garments of their manufacture against a number of well-known proprietary agricultural chemicals.

In carrying out these tests full strength applications of various chemicals were used throughout, and contact with sample pieces of clothing material and glove fingers (which were immersed in beakers), were made over a period of seven days and in normal temperature ranges extending from frost to 75° F.

In all cases no reaction of any kind was found with the materials tested and further examination was made, after thorough washing and decontamination, with 10 per cent washing soda solution which was subsequently applied.

The chemicals used for these tests were as follows:—Murphos Parathion 20; Phosphomort; Thiopal; Fosferno 20; H.E.T.P.; Mortopal; "Abol" DNC Winterwash.

It appears that correct application and handling of these clothing materials will completely avoid the risk of serious chemical contamination to operators.

## Industrial Cleanliness

A NATIONAL "Good Housekeeping" week for British Industry, from April 2-7, 1951, is being organised by the Royal Society for the Prevention of Accidents.

The object of the week, which has been arranged in co-operation with the Festival of Britain, is twofold.

First, to enlist the support of all employers and employees in securing tidiness and cleanliness in the workshop, for experience shows that they are invaluable factors in reducing accidents. Results thus achieved also increase productivity, eliminate waste and help in salvaging scrap material.

Second, to provide an opportunity for a general spring-cleaning of British factories in readiness for the Festival.

A programme of suggested activities is being drawn up and the society is preparing special publicity material, including a booklet for distribution to factory workers.

## Stearic Acid Imports

THE Ministry of Food, in agreement with the Board of Trade, announces that, during the period 1 January to 31 March, 1951, further individual import licences will be granted for limited quantities of double and triple pressed stearic acid consigned from, and originating in, any country other than:—

Albania, Argentina, Bolivia, Bulgaria, Canada, Colombia, Costa Rica, Cuba, Czechoslovakia, Dominican Republic, Ecuador, El Salvador, French Somaliland, Germany (Russian zone), Guatamela, Haiti, Honduras, Hungary, Iran, Japan, Korea, Liberia, Mexico, Nicaragua, Panama, Philippines, Poland, Roumania, Tangier, United States of America, Union of Soviet Socialist Republics, Venezuela, Jugoslavia.

Applications for import licences should be made on Board of Trade form ILD/A which may be obtained from the Import Licensing Branch of the Board of Trade, Romney House, Tufton Street, London, S.W.1., or from the usual Customs Offices. For administrative convenience, importers are asked to send completed application forms to the Board of Trade through the Ministry of Food, Oils and Fats Division, London Road, Stanmore, Middlesex, to arrive there not later than 27 December, 1950.

## Sulphur Recovery and Supplies

THE amount of sulphur at present recovered from treating coal gas from coke oven and coal carbonisation plant was approximately 100,000 tons a year, stated Mr. P. Noel-Baker, Minister of Fuel and Power recently.

In that part of the coal gas derived from coke ovens and coal carbonisation plants which is at present used without purification was treated for the recovery of sulphur, it was estimated that the additional sulphur so obtained would amount to 500,000 tons a year. The cost, however, would be very high.

Existence of crude sulphur deposits in the Colonies and reports of the existence of deposits elsewhere in the Commonwealth and in foreign countries had been investigated, stated Mr. Henry Rhodes, Parliamentary Secretary to the President of the Board of Trade in a written answer.

These inquiries had not shown the existence of any workable deposits. Processes for the extraction of sulphur from sulphur-bearing materials such as pyrites and spent oxide had been investigated in detail and, although they were uneconomic at the time, were now being considered.

# CHEMICAL EXPORTS EXCEED £11m.

## *November Values Achieve New Record*

EXPORTS of chemicals, including drugs, dyes and colours in November, set up a new record with a total value of £11,077,317. This exceeded October's record by £477,323 and was £4,183,623 more than the total for November 1949.

Among the notable increases revealed by *Trade and Navigation Accounts of the United Kingdom* compared with last year were: bleaching powder £31,726 (£11,852); copper sulphate £255,724 (£97,068); lead acetate £95,672 (£34,807); magnesium compounds £52,622 (£29,797); sodium carbonate £353,942 (£134,416); and caustic soda £518,991 (£254,287).

In the non-ferrous metals group, which totalled £7,090,701 compared with £5,538,156 in the same month of last year, outstanding items were tin £715,938 (£364,606); tungsten £26,522 (£8,958) and lead £101,995 (£37,816).

| | Nov., 1950 | Nov., 1949 |
|---|---|---|
| | Gal. | Gal. |
| Cresylic acid | 466,437 | 310,450 |
| | Lb. | Lb. |
| Salicylic acid | 124,584 | 286,444 |
| **Value of all other sorts of acid** | £194,112 | £143,559 |
| | Tons | Tons |
| Sulphate of alumina | 3,150 | 2,063 |
| All other aluminium compounds | 409 | 2,340 |
| Ammonium sulphate | 12,842 | 18,989 |
| Ammonium nitrate | 6,243 | 4,839 |
| All other sorts of ammonium compounds | 2,208 | 1,453 |
| | Cwt. | Cwt. |
| Bleaching powder | 29,424 | 11,446 |
| All other bleaching materials | 14,014 | 10,243 |
| Collodion cotton | 3,005 | 1,588 |
| | Tons | Tons |
| Copper sulphate | 4,585 | 2,238 |
| | Cwt. | Cwt. |
| Disinfectants, insecticides, etc. | 48,119 | 43,180 |
| | Tons | Tons |
| Fertilisers | 4,674 | 2,533 |
| **Value of gases (compressed, liquefied or solidified)** | £35,755 | £23,575 |
| | Cwt. | Cwt. |
| Lead acetate, litharge, red lead, etc. | 15,657 | 5,435 |
| | Gal. | Gal. |
| Tetra-ethyl lead | 88,109 | 101,770 |
| | Tons | Tons |
| Magnesium compounds | 1,022 | 639 |
| | Cwt. | Cwt. |
| Nickel salts | 6,667 | 4,801 |
| Potassium compounds | 8,798 | 6,799 |
| | Tons | Tons |
| Salt | 24,521 | 22,105 |
| | Cwt. | Cwt. |
| Sodium carbonate | 629,093 | 241,328 |
| Caustic soda | 430,839 | 219,589 |
| Sodium silicate | 41,155 | 17,790 |
| Sodium sulphate | 84,930 | 75,126 |
| All other sodium compounds | 94,084 | 103,611 |
| | Gal. | Gal. |
| Tar, creosote, anthracene oils | 4,108,071 | 2,596,803 |
| | Tons | Tons |
| Zinc oxide | 1,230 | 1,457 |
| **Total value of chemical manufactures (excluding drugs and dyestuffs)** | £6,262,007 | £3,964,734 |
| **Value of quinine and quinine salts** | £28,604 | £24,183 |
| | Lb. | Lb. |
| Acetyl-salicylic acid | 238,482 | 195,830 |
| | 100 International Units | 100 International Units |
| Insulin | 822,656 Mega Units | 556,361 Mega Units |
| Penicillin | 1,407,738 | 591,892 |
| **Total value of drugs, medicines and preparations** | £2,356,836 | £1,250,237 |
| **Total value of dyes and dyestuffs** | £1,097,566 | £627,778 |
| **Total value of chemicals, drugs, dyes and colours** | £11,077,317 | £6,893,694 |
| | Cwt. | Cwt. |
| Plastic materials | 80,851 | 37,736 |
| **Value of all plastic materials** | £1,035,614 | £452,645 |
| | Cwt. | Cwt. |
| Chemical glassware | 1,379 | 1,085 |
| **Value** | £53,583 | £49,759 |
| | Cwt. | Cwt. |
| Fans | 4,020 | 4,572 |
| **Value** | £107,913 | £132,814 |
| | Cwt. | Cwt. |
| Furnace plant | 9,066 | 7,019 |
| **Value** | £96,412 | £75,975 |
| | Cwt. | Cwt. |
| Gas and chemical machinery | 22,996 | 33,966 |
| **Value** | £268,065 | £418,364 |
| **Value of scientific instruments (optical)** | £79,356 | £73,001 |
| **Value of thermometers, mercury-in-glass instruments, etc.** | £53,358 | £35,407 |
| | Cwt. | Cwt. |
| Air and gas compressors and exhausters | 15,370 | 12,597 |
| **Value** | £298,721 | £285,828 |
| **Non-ferrous metals—** | Cwt. | Cwt. |
| Aluminium and aluminium alloys | 121,620 | 109,805 |
| **Value** | £1,497,619 | £1,285,874 |
| | Lb. | Lb. |
| Bismuth metal (not including alloys) | 17,563 | 36,170 |
| **Value** | £14,775 | £18,390 |
| Brass and other alloys of copper, other than nickel alloys | Cwt. 116,920 | Cwt. 100,814 |
| **Value** | £1,442,166 | £949,585 |
| | Tons | Tons |
| Copper | 4,794 | 7,528 |
| **Value** | £1,213,032 | £1,233,675 |
| | Tons | Tons |
| Lead, unwrought sheets, etc. | 619 | 229 |
| **Value** | £101,995 | £37,316 |
| | Cwt. | Cwt. |
| Nickel and manufactures | 12,318 | 9,232 |
| **Value** | £241,894 | £130,673 |
| | Cwt. | Cwt. |
| Nickel alloys | 3,935 | 3,077 |
| **Value** | £65,396 | £63,880 |
| | Tons | Tons |
| Tin, unwrought | 790 | 483 |
| **Value** | £715,938 | £364,606 |
| | Lb. | Lb. |
| Tungsten | 39,906 | 11,607 |
| **Value** | £26,522 | £8,958 |
| | Tons | Tons |
| Zinc | 661 | 421 |
| **Value** | £140,168 | £59,416 |
| **Total value of non-ferrous metals group** | £7,090,701 | £5,538,156 |

# SOUTH AFRICAN NEWS

*From Our Own Correspondent*

MANY paint pigments, including zinc oxide, are found in South Africa and are a help to the South African paint industry, says the Bureau of Standards in a report. Its good hiding power and wetting properties also make it suitable for a wide range of paints such as oil paints, flat paints, primers, roof paints and structural steel paints. The Bureau also states that the Standards Council has now published a quality specification for zinc oxide for paints, and has published three quality specifications for raw, refined and boiled linseed oils for use in paints.

Heavy duty mills, banburys and calenders are being installed by Clemco (Pty.), Ltd., Main Road, Edenvale, Transvaal, to produce cellulose acetate moulding powder, polyvinyl chloride cable-insulating compound and various kinds of plastic sheeting. This factory is now extruding tubing and rod water hose and compressor hose in diameter from ½ in. to over 3 in. From December the monthly production of acetate and PVC is expected to be raised to about 60 tons.

An oil-bound distemper for interior decoration, and intended to replace similar imported lines, has been developed after long experimentation by South African paint manufacturers, and specialised industrial finishes, formerly imported, are now being produced by a recently established firm in Johannesburg. Where it is not possible to supply a customer with a suitable finish out of its stock lines, the firm works in collaboration with its overseas associates to make the required article locally. Red lead, dry white lead, white lead ground in oil, battery litharge, assay litharge, grey oxide and non-setting red lead are now being produced by a new firm at Jacobs, Natal. By arrangement with the parent company overseas, the South African firm has at its disposal information from modern research departments, and some of the technical staff attached to the Jacobs plant have had training in Britain.

Afrian Dextran, Ltd., has been formed with a capital of £70,000, sponsored by Syfret's Trust Co., Ltd., 24 Wale Street, Cape Town, and backed by powerful American and Swiss financial interests. The chairman is Mr. T. C. Usher, who also holds a controlling interest. The manufacture of dextran blood plasma substitute is to start in March, under licence from Dextran, Ltd., of Darlington, the English company owned by Mr. T. C. Usher. The South African Government specification is now being drawn up, based on the British Ministry of Health's specification. No plasma substitute has been found capable of meeting this rigid specification, except that made by the British company, and now to be produced in the Union. Export orders for America have been taken by the African company which will bring in 250,000 dollars a year. Additional export orders to Australia are to start when the plant is running at capacity by the middle of 1951, when it is expected that 20,000 one-pint bottles a month will be available, more than three-quarters of which will be exported. Other pharmaceutical products based on dextran now coming into pilot plant production in England will be taken on by the associated company in South Africa. The production of penicillin, streptomycin and other antibiotics will start late in 1951.

According to the latest annual report of the holding company, African and Overseas Enterprises, Ltd., the Vrany Chemical Corporation, at Saldanha Bay, has started to produce premium salts and accumulated a stockpile of magnesium hydroxides for the manufacture of non-corrosive paints.

Dry weather delayed the start of the stripping season in some Natal wattle-growing districts. In parts of Zululand growers had begun to strip their plantations during September but recent reports indicate that these operations will have to be suspended temporarily until after the rains have fallen. Production is lower this year than last.

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## Wool Research Council

The formation of a Wool Textile Research Council has been announced by the Wool Textile Delegation. The council will consist of 21 representatives of various wool trade employers' associations, trade union officials and professors from Leeds University and West Riding technical institutions. In addition, Dr. E. G. Carter of the International Wool Secretariat, and Mr. C. A. Spencer, of the Department of Scientific and Industrial Research, are to act as observers.

The objects of the new council are to encourage research on materials, methods and processes in the industry, including the study of designs, and to co-ordinate research activities.

# WORK OF THE GOVERNMENT CHEMIST

## *First Post-War Survey of Varied Duties*

THE increasing scope and varied character of the numerous duties of the Department of the Government Chemist are summarised in the report for the year ending 31 March 1950, now published (HMSO, 1s.).

Owing to war-time restrictions and post-war economies this is the first report to be issued since 1939, and many important changes have occurred. Sir John Fox, who was appointed Government Chemist in 1936, died in 1944 and was succeeded the following year by Dr. G. M. Bennett, then professor of chemistry at King's College, London. The Deputy Government Chemist, Dr. A. G. Francis, retired in 1946 and was succeeded by Dr. J. R. Nicholls.

War, naturally greatly affected the nature and extent of the department's work, and many special investigations of considerable importance were undertaken, although not detailed in the report for lack of space.

The Department of the Government Chemist was formally constituted on 1 April 1911, but had originated in a laboratory instituted by the Board of Excise in 1842. The function of the newly constituted department was to carry out certain duties as a chemical referee laid upon the Government Chemist by Act of Parliament and to provide advisory and analytical services to all Government Departments requiring them. These services have developed widely in scope and now vary greatly in character according to the function of the department to which they are rendered.

Members of the staff serve on many committees and other bodies concerned with methods of examination and standards of quality.

### Many Aspects Considered

Such advice has to be given not only with scientific knowledge but with appreciation of the legal, industrial and administrative considerations involved.

Revenue duties give rise to important services of wide scope and great variety. Part of the work is forensic and officers of the department have frequently to appear in court as expert witnesses. An extensive and well-equipped modern analytical service is maintained and *ad hoc* investigations are carried out as required.

In addition to work for other Government Departments continuous work is necessary to maintain the scientific efficiency of the Government Chemist's Department itself. Analytical methods are kept under constant review and work on new methods is always in progress.

Headquarters of the department are in the building in Clement's Inn Passage, built under the supervision of Sir T. E. Thorpe and occupied in October 1897. There are overflow laboratories at Endell Street and Clement's Inn. The laboratories at Custom House and Foster Lane, and the chemical stations at Liverpool, Glasgow and Bristol deal with Customs and Excise matters. The chemical stations at London Dock, Southampton and Hull were closed during the war and have not been re-opened.

### More Space Needed

A laboratory is maintained at the Geological Survey and Museum, South Kensington, and the laboratories of the Ministry of Works Stores at Barry Road, Stonebridge, N.W.10, and at Droylsden, near Manchester, are run by the department. A senior officer of the department is located at the War Office as an adviser to the War Department and controls laboratories in London, Barry Docks, Taunton, Glasgow, and the Middle and Far East, for the inspection of food and supplies for the army.

Work of the department is hampered by restricted space and geographical scattering. Some relief will be obtained by the provision of additional space next year, but for the efficient carrying out of its functions a large new building is badly needed.

The department is organised in 24 divisions grouped in five branches. The branches deal with Revenue matters (two branches); Industrial and Mineral questions; and Food, Drugs, Agriculture and Water. The fifth branch is ancillary to the other four and provides administrative and technical services and makes special provision for physical methods and pure research.

Separation of the work of divisions is partly in accordance with departments worked for and partly follows chemical lines. The divisions, however, are not water-tight, and work may be passed from one division to another in accordance with the equipment and experience available.

During the year under review the department examined 414,172 samples. This represents an increase of 14 per cent

over the previous year. Much of the year's work, however, was not related to samples and many files and papers were submitted for elucidation of scientific and technical matters.

The Government Chemist's Department is an essential link in the fiscal system of the United Kingdom. Without the scientific services supplied by the department, it would be difficult to assess some of the duties levied by Parliament.

### Tariff Nomenclature

During the past year protracted technical discussions have been in progress in connection with the proposed adoption by Western Union countries of a common tariff nomenclature, and collaborative work with the Customs and Excise Department has been carried out to ascertain how the United Kingdom Tariff system would fit in with such a nomenclature.

By the nature and scope of their primary function the Revenue branches have to deal with an enormous volume of routine samples. Many special methods of testing have been evolved which enable the examination of large numbers to be conducted swiftly and accurately.

This Safeguarding of Industries Act imposed a Customs Duty on a variety of goods with a view to the safeguarding of certain special industries, Empire goods being exempted. The Board of Trade was empowered to issue lists defining the articles covered by any of the general descriptions set out in the Schedule to the Act, and the list of chemicals first issued enumerated some 5600 synthetic organic chemicals and fine chemicals liable to the duty.

The Act has been amended and continued by various Finance Acts, and the number of chemicals liable to this duty has been increased by additional lists which include a number of general headings relating to groups of dutiable compounds.

Provision has also been made for drawback of duty on re-exported goods and for the temporary exemption from duty of listed chemicals. Liability to the duty arises not only on the listed chemicals imported as individual substances, but also in respect of the listed chemicals contained in imported composite goods.

Technical advice on a very wide range of chemicals is given; the departments also advises on the definitions of chemicals for temporary exemption from duty; and assists in the compilation of new lists. In addition samples of imported goods are submitted for chemical examination.

During the year under review a committee under the chairmanship of the Government Chemist has revised and consolidated the existing lists, and a new comprehensive list of all chemicals liable to Key Industry duty has been issued. In this revision the descriptions of a number of chemicals have been changed and they are now listed under their modern names, while a number of obsolete names have been removed and new items added.

In recent years there has been a great increase in the synthetic and commercial manufacture of new organic compounds such as synthetic vitamins, drugs, antiseptics, detergents, wetting agents and plastics.

Developments in catalytic processes in the petroleum industry have resulted in the isolation of large numbers of hydrocarbons and other products not hitherto available on a manufacturing scale. It not infrequently happens that such chemicals are imported before they are adequately described in the chemical literature. This progress has naturally been reflected in the work of the department, and in many cases an extensive search of the literature and chemical investigation is required to identify the chemicals and to determine their liability to duty.

The Water Division provides a comprehensive chemical and bacteriological analytical service. Suitability of water for drinking purposes is assessed and the germicidal value of disinfectants determined. Sewage effluents were examined and three chemical surveys of the river Humber were carried out.

### Chemical Packaging

In the Industrial and Mineral branch advisory services are rendered to the Ministry of Transport on the carriage by sea of dangerous goods, including chemicals, with particular reference to suitable methods of packing and stowage to ensure safety of the ship and the crew. In view of the major developments in industrial chemicals in recent years, the present regulations which date from 1933 are being revised by a committee on which this department is represented. It is hoped that its recommendations may form the basis of an International Code.

Pyridine recovery provided an interesting example of investigatory work. The possible use of saturator liquor and crude ammoniacal liquor from ammonia recovery plants as a source of pyridine made necessary the examination of a series of samples.

The Physical Methods Division is divided into five sections: spectrochemical analysis; X-ray diffraction; infra-red spectrophotometry; polarography; and photographic work.

# TRADE SECRETS

*Despite the ever increasing exchange of technical information characteristic of the considerable good will which exists between industries, there still remains much which can rightly be held to be "top secret" from an employer's point of view. What can an employer reasonably expect in the way of discretion from his workers? The accompanying article provides some answers to this and other pertinent questions on "trade secrets."*

THE return to normal competitive conditions makes it more than ever necessary that individual processes and methods of work should not be passed on to rival organisations. Responsible employees are naturally in a position to prejudice a business by giving its secrets to rivals and it is helpful for employers to know the way in which the law safeguards their position.

The law appreciates that mutual confidence between employer and employee is essential and a term is therefore implied in all contracts of service, whether written or oral, that the employee will act with good faith. This duty arises independently of any express terms in the contract of service, but express terms may of course, widen the duty, and their effect will therefore require subsequent examination.

The implied term forbids breaches of faith by the employee both during a particular employment and after it has ended. The master has several available remedies against an employee who breaks faith. Dismissal without notice may be given and the employer can obtain an injuction against the employee and any collaborator, restraining them from profiting by the employee's breach of duty. The employer may also be entitled to damages.

As well as preventing the passing on of confidential matters, the implied duty obliges employees to report the misconduct of fellow-employees, regardless of the offender's status. By virtue of their position, executive and over-seeing staff have to report all acts of misconduct, the duty varying with the nature of their employment and their duties. The average employee, however, need usually only report acts which are criminal, fraudulent, or clearly wrong.

### Difficult to Define

The implied term also forbids the communication of "confidential information." This is rather difficult to define with precision. One concern may consider its costing system highly confidential, while another would attach little importance to the system, but much to the way in which a particular costing has been built up. The application of the term largely depends on the facts of each case, and decisions of the Courts provide a useful guide.

In one case, an employer was granted an injunction restraining his former employee from using a copy of his order book for the purpose of soliciting orders for a rival firm and was also awarded damages. Again, where the employee of a firm of engine manufacturers secretly made notes of the engine dimensions, the employers were granted an injunction restraining him from communicating this information to other persons.

### Right to Good Faith

When the implied duty is being considered in relation to border-line cases, where it is not clear whether confidential information is involved, the general policy of the law that employees should be free to acquire as much skill and knowledge as possible in their trade or calling, must be kept in mind. However, the law recognises that employers have a right to good faith from their employees, and in three cases, information, no matter of what type, is always confidential.

First of these is when it is an express term of the contract that it should be so. Secondly, where the nature of the employment is such that a particular matter would obviously be defined as confidential. Thirdly, where information is surreptitiously acquired by the employee. Outside these three cases, it seems that the employee may make use of such information as he might reasonably be expected to remember. Thus an employee may canvass his former employer's customers so long as he does not make use of information acquired other than by the habit of dealing with those customers. In other words, that he does not use lists compiled during his employment.

This implied duty to keep good faith is generally an adequate safeguard to the employer, but definite terms may be necessary in the case of technical experts and managerial grades. A formal contract of service with such employees is advisable and a term putting a restraint on

their future activities when their employment ends, can be included. For such restrictions to be legally enforceable however, the employer must be able to show that they do no more than is necessary to give reasonable protection to his proprietary interests and are not against the public interest. He must show that the area or space restriction and the period for which it is to last, are reasonable.

Under this rule, a covenant by the manager of a concern using a secret process to manufacture glass bottles, that he would not serve a competing concern for five years, was upheld as being reasonable. On the other hand, a covenant by a canvasser in Islington, prohibiting him from entering similar employment within 25 miles of London, was held to be unreasonable and invalid.

Restrictive covenants give employers an added measure of protection, but the law concerning them is complex. Therefore, unless it is merely intended to prohibit an employee from entering the service of named competitors, it is advisable to obtain professional advice in drafting the covenant.

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## SULPHUR PROBLEMS IN U.S.

### *Shortages and Expected Restrictions*

CRITICAL shortage of sulphur is expected to lead in the U.S.A. to formal action soon being taken to impose restrictions not only on its export but also on its domestic consumption.

Present supplies of sulphur are estimated to be approximately sufficient for five months, and the National Production Authority has already informed the industry that it may be necessary to divert some to the stock reserves. It is pointed out that prior to America's entry into the war in 1939 the nation had a 27-month supply on hand compared with the present meagre stocks.

Meanwhile, with the demand for sulphur outstripping available supplies by a good margin, NPA controls over sulphur are expected to include:—

(1) An order limiting consumption by all sulphur users to about 85 per cent of the quantity consumed in a specified base period, probably the year ended 30 June 1950, and

(2) An order reducing exports by about 25 per cent.

Interested Government agencies are reported to be considering how much sulphur must be exported in 1951 to avoid undue hardships to friendly nations.

Reserves of naturally-occurring sulphur in the U.S.A. are believed to total about 2.3 million tons. About 75 per cent of the sulphur produced is turned into sulphuric acid, which is essential for the defence programme and touches on most phases of civilian production.

The principal reason for current shortages is the fact that sulphur consumption has so far outpaced production—even record production. Although the four main U.S. producers of sulphur—Texas Gulf Sulphur Company, Freeport Sulphur Company, Du Val Sulphur & Potash Company, and Jefferson Lake Sulphur Company—may turn out some five million tons of sulphur in 1950, this will be substantially below domestic consumption and exports.

Domestic consumption is expected to total 4.5 million tons while exporters will take an additional 1.2 million tons for the year, all of which will materially reduce available stocks and inventories. To offset any drastic reductions in supplies, however, the four companies, either voluntarily or at the instigation of the government, will probably effect reductions in shipments to customers.

Meanwhile, as a result of the steady expansion of pyrites mining in Japan, production of sulphuric acid has increased sharply, according to reports of the U.S. Office of International Trade. Output in August this year was 275,600 metric tons compared with 210,720 tons in the same period of 1949. Monthly production in future is expected to fluctuate with demand, rather than, as previously, with the availability of pyrites.

#### European Production

In Spain the first pyrites furnace at the plant of Sociedad Espanola de Fabricaciones Nitrogenadas (Sefanitro), near Bilbao, began operations in September, marking an important step in the factory's production of sulphuric acid. The plant is believed at present to be producing some 200 metric tons daily and with the installation of additional equipment this is expected to be increased to 400 tons.

Production of sulphur ore in Italy in the first half of this year achieved a post-war record with a total of 820.560 metric tons. Italy is reported to have placed the following quantities of sulphur (in thousands of tons) at the disposal of the OEEC countries: 1951-52, 200; 1952-53, 250; 1953-54, 350; and 1954-55, 450.

Most of the industry is centred in Sicily, but it is hampered by old equipment and uneconomic methods of operation, and Marshall Aid has been requested to modernise and develop it.

# THE CHEMIST HELPS TO BUILD

"BUILDING Research in 1949" is the subject of a report just published by the Department of Scientific and Industrial Research (H.M.S.O., 3s.). In it, some interesting facts are given about the way in which the work of the chemist is used to investigate the properties of building materials.

For example, investigations on the corrosion of aluminium and its alloys by building materials are continuing. During two years outdoor storage specimens embedded in rich Portland cement-sand mortar have shown slight but progressive corrosion and cracking of the mortar in varying degrees. In indoor wet storage, cracking previously observed at one year for one alloy only, has developed further. With cement-lime-sand mortar, after two years outdoors, effects are much less marked than with cement-sand mortar, while indoors no cracking has occurred.

Similar tests, indoors, in a moist atmosphere, with high calcium lime and magnesian lime mortars and with retarded hemi-hydrate gypsum plaster-sand mixes, show only slight reaction up to one year. A Keene's plaster used neat, however, caused rather more corrosion with some alloys. The observed effects are not all equally severe, but they demonstrate the desirability of using a protective treatment, such as a bituminous paint, where aluminium or a susceptible alloy is to be placed in contact with mortar or plaster in circumstances where the conditions are liable to be damp.

### Weathering Tests on Aluminium

Observations are being made of the weathering behaviour of samples of cast extruded aluminium rain water goods made to British Standard 1430 and exposed at the station in a rural atmosphere. Unpainted cast goods in certain alloys have been heavily corroded after eight months' use. Others painted when in a new condition with proprietary undercoat and finishing paints have been satisfactory up to 18 months. Similar painting of corroded surfaces after wire-brushing gives an inferior finish and the life of the paint may be adversely affected. The painting procedure should normally follow that recommended in the appropriate code of practice.

A "National Building Studies" report is being prepared dealing with corrosion of steelwork in steel-clad and steel-framed houses built in 1920-1927. This survey was undertaken in collaboration with the Ministry of Works (Chief Scientific Adviser's Division) the Chemical Research Laboratory, and the Paint Research Station, to determine the extent of corrosion in cavity walls with the protective coatings then given, and to estimate the standard of protection required in future construction. A limited examination was also made of steelwork other than that in cavities, both indoors and outdoors.

### Two Coats Sufficient

Simple two-coat paint protection was found to be adequate except where faulty design had permitted rain to penetrate into the cavity. Where rain-penetration can occur even the best type of protection that is economically practicable would be ineffective over the long period for which a house is normally designed. This emphasises the importance of good design as an essential safeguard.

There were few indications of excessive condensation in those wall cavities examined which had steel sheet on both sides. Where external steel sheets are used with permeable insulating materials for the inner leaf, there will be a greater risk of condensation and corrosion in the cavity unless a vapour barrier is incorporated.

A case of corrosion of a copper roof covering to a dormer window has been examined in which the metal, which had been in place for about 40 years, had become perforated with holes an inch wide where it received the drips from a tiled roof. The holes were spaced at about six inch centres, mainly in places corresponding with the position of the joints in the first course of tiles. The roof faced north-west and was more or less covered with vegetation. Attention has been drawn from time to time to similar channelling and perforation of lead exposed to the run-off from roofs. These roofs have usually been in rural districts where there has been vegetation on the slates or tiles. It seems possible that the corrosion effects are accentuated by vegetation which may be presumed to increase the acidity of the rain water draining from the roof.

During the past few years the flow of requests for tests on flooring materials has reflected the continued search by manufacturers for suitable materials to cover concrete floors.

Tests have been carried out on jointless, sheet and tiled materials and it is interesting to note that sheet materials form by far the smallest number. Even these are

not new types but modifications of rubber sheet and it seems that a new substitute for linoleum has not yet appeared in commercial amounts. The jointless materials tested have been mostly variations of pre-war types such as magnesite and cement-rubber latex. The only novel material in this group used polyvinyl acetate emulsion as the binder. New materials are most common among the tiled coverings. None of the tiles tested was in use before the war and all but one of them incorporated synthetic resin as the base. Those using thermoplastic resins have generally proved to be more successful and less restricted in use than those using thermo-setting resins.

### Experiments Continued

Apart from performance tests on new flooring materials submitted by manufacturers, experimental work has continued to be directed to studies aiming at providing data on which accelerated laboratory tests for wear, slipperiness, etc., can eventually be based.

Mention was made in the report for 1948 of the pilot flue which had been constructed of heat-resisting glass to study flue conditions. During the year it has been used to study condensates. The results obtained so far suggest that the chemical attack on chimneys used for domestic boilers, etc., cannot be accounted for by the formation of sulphuric acid as has previously been assumed.

A more probable mechanism is the production of a series of compounds of ammonia, sulphur dioxide and oxygen. Conditions of use will determine the relative proportions of the compounds produced which differ considerably as regards the vapour pressure of water over their solutions; at least two are so hygroscopic that they will liquefy in air of the range of humidity likely to occur in the flue. Some of them have been shown experimentally to cause relatively rapid breakdown of ordinary cements and mortars.

### Interesting Conclusion

An interesting conclusion is that damage may be most rapid when a flue which has been lined with cement or cement-lime mortar is out of use; liquefaction has been observed a few hours after the fire has been allowed to go out.

The wetting of brickwork and staining of plaster, which often occurs, appears to be a separate phenomenon, though often overlapping with the formation of aggressive ammonium compounds. A major factor in this case appears to be the use of wet fuel which can introduce more water than the wet rubbish to which the trouble has often been attributed. Wet fuel may arise through insufficient covered storage accommodation, but it may arise through the fuel being delivered wet. In the course of the work a number of samples of coke were found to have a water content averaging about 23 per cent.

### Non-Traditional Type Trials

Full-scale trials on non-traditional types of flue materials have now begun. Asbestos cement, cast iron, wrought iron and three varieties of enamel on steel, are being used, all attached to boilers of similar design. One of the enamels is also being tried with two other boilers, one giving hotter, and the other cooler, flue gases. They are at present being run under conditions corresponding with a convective heater system, but provision is made whereby the air-warming jacket can be used to give " air-pocket " insulation.

In all cases, any condensate forming in the upper part of the flue can be collected for examination. The period of running is not yet long enough for destructive effects to be noticed, but the data already obtained as to the temperatures prevailing in practice are likely to be useful, as little information has been published.

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## PLASMA FROM SEAWEED

THE only known sample in the world of a new chemical derived from seaweed, Laminarin, a possible substitute for blood plasma was shown to the Secretary of State for Scotland, Mr. Hector McNeil, when he opened a new laboratory at the Seaweed Research Institute at Inveresk, near Edinburgh, on 22 December. This use of the new chemical, which is a type of seaweed starch, is now being investigated by scientists in London.

It has been pointed out that if the new chemical can be used for blood plasma, it will considerably reduce demand for blood donors. The potential harvest of dried seaweed from the Scottish coasts next year, it was stated, was about 200,000 tons, capable of producing about 40,000 tons of the new chemical.

The new laboratory is named after the late Professor J. Masson Gulland, a native of Edinburgh and a pioneer in seaweed investigation who until his death in 1947 was professor of chemistry at Nottingham.

# SIMPLE VOLUME DILATOMETER

THE simple, inexpensive volume dilatometer has been found by scientists at the U.S. National Bureau of Standards to be a valuable research tool, not only for obtaining data on volume coefficients of thermal expansion, but also for studying phase changes in solids and liquids. The continued use of volume dilatometry at the Bureau over the past 15 years has resulted in improvements in technique and in simplification of the apparatus to such an extent that accurate dilatometers can now be made and used in almost any small laboratory.

Linear dilatometers of various types have frequently been used to advantage in determining the expansivity of metals and other solid materials. They cannot, however, give correct results for liquids or other fluid materials. In these cases the volume dilatometer can be used successfully; it has been shown to have a precision of about 1 per cent.

### Change of Volume

Primarily, the volume dilatometer measures the change of volume of a sample as it undergoes a change in temperature. Its secondary importance lies in the discovery of phase-changes and other transitions. Thus, if the density or volume of a substance is plotted as a function of the temperature, there will be anomalies in the otherwise smooth curve wherever there is a change of phase or other transition. These anomalies represent points at which a charge occurs in the structure of the sample or in the types of motion by which it can absorb energy. They may or may not be accompanied by the release or absorption of heat.

Materials for the construction of the instrument consist of glass tubing of any convenient size and a calibrated glass capillary. The confining liquid may be mercury or any other substance which has a known expansivity and which will not react with the sample. Uniform heating is provided by means of a bath containing alcohol, water, or a high-boiling oil, depending on the range of temperature to be studied.

(*continued at foot of page* 914


*Materials for constructing the dilatometer include a glass capillary of uniform bore, 2 mm. in inside diameter, and a glass tube of 20 mm. in diameter. After the capillary has been calibrated, it is sealed to the 20 mm. tube. The sample is introduced into the tube, and a glass bulb (A) is added. This bulb is used to prevent overheating of the sample when the tube is sealed off (B). The completed dilatometer is then inverted and connected to a mercury reservoir and a vacuum pump (C), is exhausted, and filled with mercury to a convenient level in the capillary.*

# COBALT NAPHTHENATE

By A CONTRIBUTOR

THE use of cobalt naphthenate for initiating and accelerating gelation of polyester resins in styrene monomer is a new development of considerable practical interest. About 0.10 per cent cobalt metal concentration is claimed to give good results with 1-2 per cent catalyst, usually of the hydroperoxide type. The procedure adopted with polyester resins is to add the correct proportion of naphthenate to the liquid resin, to mix well so as to effect complete solution and then to add the necessary quantity of catalyst directly before use. Although resins containing the gelation agent can be kept for several months without showing any marked changes in viscosity, the bench life of a resin to which catalyst has been added is very short and may, in fact, only be about 30 minutes.

### Effect on Resins

Cobalt naphthenate is a hard light violet coloured material containing about 12 per cent in the solid state, 8 per cent as concentrate and 6 per cent as solution. When added to polyester resins it colours the resin a purple red shade and cannot, therefore, be used where light, clear coloured fabricated forms are required.

The main advantages of employing this metallic naphthenate to initiate gelation and propagate cure of polyester resins can be summarised as follows:—

1. Cobalt naphthenate can be readily incorporated in the resin and also in most resin diluents, such as styrene; moreover, the life of the modified resin extends to several months provided no catalyst is present.

2. When used with a suitable catalyst the naphthenate enables cures to be effected at room temperatures.

3. The cobalt naphthenate has no deleterious effect (except colour) on the physical properties of the polyester resin, *i.e.*, it does not encourage crazing and will not destroy inhibitors present in resin stock.

4. There are no hazards involved in handling or using the naphthenate provided it is never mixed with the catalyst.

### Storage Problems

In works practice it is of great importance that the resin should be stored at 75° F. (max.) and never kept in stock more than a few months. Standardisation of production depends upon maintaining a uniform bench life and this can only be ensured by using fresh resin of good quality, that is free from likely contaminating agents, such as metallic impurities which are known to interfere with curing. Temperature is of very great significance and an increase of 10° F. will in some cases halve the curing time. Metal content, *i.e.*, cobalt, and the percentage of catalyst employed also have a pronounced effect on the length of time it takes to polymerise or harden the resin. It is known, of course, that exposure to ultra violet light accelerates polymerisation.

The use of cobalt naphthenate as an accelerator is particularly valuable where very large shapes, such as aircraft parts and industrial mouldings, are being produced, and where it is known that the use of extraneous heat would be too difficult to apply or liable to encourage the development of internal stresses.

It is interesting to note that Rohm and Haas Company, U.S.A., now advocate the use of cobalt naphthenate as an accelerator for their "Paraplex" "P" series of unsaturated polyester resins in monomeric styrene.

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### SIMPLE VOLUME DILATOMETER

*continued from page 913)*

The preparation and operation of the volume dilatometer are as follows: A glass capillary is carefully calibrated and sealed to one end of a larger glass tube. The weighed sample is introduced into the tube, a glass bulb is added, and the tube is sealed. The bulb is used to prevent overheating of the sample during the sealing operation. The dilatometer is then weighed, evacuated, filled with mercury, reweighed, and then placed in a bath. As the bath is heated, the sample expands, forcing mercury up into the capillary where readings may be made. From the known weights and densities of the sample and the confining liquid and from the known expansivity of the confining liquid, the expansivity of the sample can be calculated. Corrections must be applied for entrapped air bubbles, nonuniformity of the capillary, and the thermal expansion of glass.

# NON-FERROUS METAL PRICES

INCREASED premiums for imported electrolytic copper were announced by the Ministry of Supply last week to become effective on 1 January.

Selling prices for special shapes and special specifications will be subject to additions per ton to the basis price of copper as follows:—

*CANADIAN*

| *Vertically Cast Cakes of:—* | *Present Addition* | *Addition Chargeable from 1 January 1951* |
|---|---|---|
| Not more than 800 lb. weight or less than 3 in. thick | £2 10s. 0d. | £4 2s. 6d. |
| Over 800 lb. up to 1000 lb. | £2 17s. 6d. | £4 10s. 0d. |
| Deoxidised 1000 lb. | £8 2s. 6d. | £11 12s. 6d. |
| Silver Bearing 1000 lb. | £6 17s. 6d. Plus silver content | £10 12s. 6d. Plus silver content |
| Silver Bearing 300 lb. | £6 10s. 0d. Plus silver content | £9 12s. 6d. Plus silver content |
| *Vertically Cast Wirebars* | | |
| All sizes from 155 lb. to 545 lb. | £2 10s. 0d. | £3 2s. 6d. |
| 750/800 lb. | £3 5s. 0d. | £3 17s. 6d. |
| Silver Bearing 275 lb. and 545 lb. | £6 10s. 0d. Plus silver content | £8 12s. 6d. Plus silver content |
| *Billets—Tough Pitch* | | |
| 3 in. or more, but less than 4 in. dia. | £9 15s. 0d. | £12 2s. 6d. |
| 4 in. or more, but less than 8 in. dia. | £8 10s. 0d. | £10 17s. 6d. |
| Phosphorised 3 in. dia. | £10 10s. 0d. | £12 17s. 6d. |
| Phosphorised 4 in. dia./upwards | £9 7s. 6d. | £11 12s. 6d. |

*AMERICAN*

| *V.C. Cakes* | *Present Addition* | *Addition Chargeable from 1 January 1951* |
|---|---|---|
| Silver Bearing 300 lb. | £6 10s. 0d. Plus silver content | £9 12s. 6d. Plus silver content |
| OFHC 300 lb. | £10 12s. 6d. | £13 2s. 6d. |
| *Billets* | | |
| Plain Phosphorised or OFHC Phos., or plain OFHC | | |
| 3 in. diameter | £10 10s. 0d. | £12 17s. 6d. |
| 4 in. diameter and over | £9 7s. 6d. | £11 12s. 6d. |
| *V.C. Wirebars OFHC* | | |
| 255 lb. Regular or Phosphorised | £9 7s. 6d. | £11 12s. 6d. |
| Scalped Horizontal Wirebars | £1 10s. 0d. | £1 17s. 6d. |

## *Pipes and Tubes for Pressure Vessels*

FOLLOWING the publication of B.S.1500, Fusion welded pressure vessels, the British Standards Institution has just published in one document two Standards B.S.1507 and B.S.1508, "Ferrous pipes and tubes for pressure vessels for use in the chemical and allied industries."

This document contains a comprehensive range of specifications for pipes and tubes manufactured from 12 types of steel covering mild steel, alloy steel and austenitic steel. Full details are given of chemical compositions, mechanical properties, methods of test and tolerances in finished pipes and tubes.

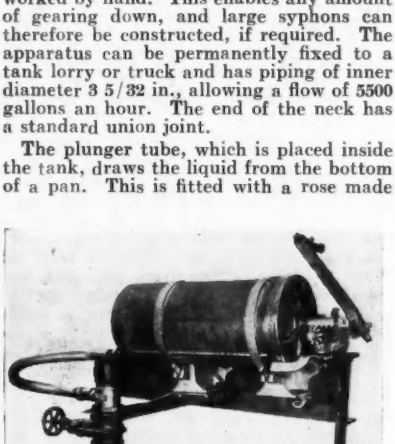
Copies are obtainable from the British Standards Institution (10s. 6d. post paid).

# NEW TANK-EMPTYING DEVICE

A NEW device for the emptying of trucks or tank lorries has recently been constructed by the *Manufacture Française de Vide Touries Automatiques*. Because it appears to offer considerable advantages over existing arrangements for the emptying of vehicles designed to carry chemicals, the new device should prove of interest to many chemical manufacturers. Chemicals normally difficult to handle, such as nitric acid, oleum and trichlorethylene are dealt with more easily by the use of the new equipment.

Essentially, the new device consists of a syphon which is primed by displacing a piston by means of a rack and pinion worked by hand. This enables any amount of gearing down, and large syphons can therefore be constructed, if required. The apparatus can be permanently fixed to a tank lorry or truck and has piping of inner diameter 3 5/32 in., allowing a flow of 5500 gallons an hour. The end of the neck has a standard union joint.

The plunger tube, which is placed inside the tank, draws the liquid from the bottom of a pan. This is fitted with a rose made



*The tank-emptying device ready for operation, showing the valve-joint on the left*

at the bottom of the tank. The tube passes through the wall of the dome; thus there is no inconvenience when re-filling or when the tank has to be entered for inspection or cleaning. The cylinder, containing the piston which constitutes the priming device, is placed under the side sill.

Among the advantages claimed for the new device are the elimination of the centre safety valve and the two customary drain cocks or gate valves. There is no danger of leakage from the drain-pipe, nor is there need for frequent renewal of joints and valves. Maintenance costs are low. There is little likelihood of any liquid losses due to fracture of the drain-pipe. Safety measures are provided to prevent withdrawals during transit.

The new tank emptier can be fitted to a fixed point on various existing types of tank lorries and, with a detachable pipe, can be mounted on wheels where it is required to empty trucks or tank lorries which have not been fitted beforehand.

*Close-up of the device fitted to a truck, with the handle folded flat against the side sill*

## Crystal Process in Oil Separation

A NEW process, developed by the Texaco Development Corporation, which promises to produce fat components in practically pure form, will find its first commercial application in a new chemical plant costing several million dollars now being completed near Chicago, Illinois, by Armour and Company. The new process, fatty oil fractional crystallisation, will be used to separate various components of vegetable, marine, and animal oils by a special technique of chilling the materials in solvent to crystallise out the required component in solid form. The high purity fractions separated are the commercially important saturated and unsaturated fatty acids such as stearic, oleic, linoleic, etc., as well as the glycerides.

### Japanese Scientist to Stay in U.S.A.

Dr. Hideki Yuakawa, the Japanese atomic scientist, who won the Nobel Prize for Physics in 1949, has accepted the permanent post of Professor of Physics at Columbia University. He has been visiting professor at the university since 1949.

## SOLENT OIL REFINERY PROJECT

THE proposed establishment of an oil refinery on the Solent coast, east of the Hamble river, was recently discussed in the House of Commons.

Raising the matter, Brigadier Sir George Jeffreys said that support and encouragement for the setting up of a refinery in that area had been given to the Caltex Petroleum Company of the United States by the Government, without the approval of, and even without consulting the Hampshire County Council, which by Act of Parliament, was the local planning authority.

The defence of the Ministry of Town and Country Planning in trying to push the project through over the heads of the local planning authorities was stated in a letter which maintained that in certain exceptional cases the broad location of such a project must be determined by considerations of national policy.

Summing up the debate, Mr. G. S. Lindgren, Parliamentary Secretary to the Ministry of Town and Country Planning said that it seemed that everybody was agreed that we must have oil refineries in this country to save dollars and put ourselves more nearly on a basis of not requiring dollars for petroleum products.

Everyone would agree that refineries have to be sited in relation to the fact that tankers are required to bring the crude oil, and that they must have deep water and facilities which will enable those tankers to berth and discharge their cargo. It was obviously in the interests of efficiency and economy that a refinery should be sited in relation to the area which its products are to serve.

There was a defence aspect, and, therefore, in the initial stages, it was asked that the project should not be noised abroad. So far as the general location was concerned, it was obvious that, in regard to certain projects, the nation as a whole must decide within broad terms, and that was done in this case.

After the broad terms of the location had been decided, there should be local consultation and decision in regard to its application, and, again, that would be done in this case.

As soon as the actual location had been decided, planning permission would be applied for to the Hampshire County Council, and that authority would have the opportunity, as well as the firm concerned, if they wished, to appeal to the Minister, if one side or the other did not agree with the decision of the county council.

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## MATERIAL SHORTAGES

### *Government's Intentions Announced*

ANNOUNCEMENTS of the Government's intentions to try and overcome the problems caused by shortage of raw materials were given in the House of Commons last week, by Mr. John Freeman, Parliamentary Secretary to the Minister of Supply.

The Minister's statements followed appeals from M.Ps. on both sides of the House that metal users should be told the position and the probabilities of future supplies.

Dealing with the various shortages, Mr. Freeman denied complacency of the Government, but admitted that it was clear that emergency action must be taken in the case of some materials.

*Zinc.*—This was the most serious of the metal shortages, and the Ministry had stopped forward buying in November. An allocation system was to be introduced, as from 1 January. It was, however, a matter of great complexity, and the system as introduced would probably not be as extensive or as effective as it would be possible to make it in subsequent months. Neither price nor dollars would be the consideration preventing any available supplies being taken up.

*Sulphur.*—The U.S. Government had taken over the allocation of American supplies both for home and export. No announcement had yet been made to other countries as to what allocations they were likely to receive. Referring to emergency shipments, he said, that an instalment of 20,000 tons for the manufacture of sulphuric acid had been promised for January. Arrangements had also been made for an emergency consignment of 7500 tons to be dispatched to the U.K. this month, for purposes other than sulphuric acid. Our shortages were very serious.

*Steel.*—The like volume of imports of scrap or iron ore was not known, it seemed doubtful that there would be enough raw materials next year for the volume of steel production to go on increasing as it had done in the past three years. Output would, however, be maintained at the 1950 level of 16.25 million tons.

*Aluminium.*—New contracts had been made with the Aluminium Company of Canada to ensure sufficient supplies in 1951 to cover the defence programme and essential civilian requirements.

# HOME

### New Rise in Wolfram

The price of wolfram was again increased last week. Quotations in London on 18 December were 360s. to 375s. per unit c.i.f. European ports compared with a previous price range of 350s. to 360s. nominal.

### Export Licensing Changes

Licences are now required for the export of certain plastic materials, some additional metals and alloys, and specified drugs and chemicals. From 18 December, however, some drugs will no longer require licences.

### Soap Works Explosion

An explosion occurred on 13 December at the works of Joseph Crosfield and Sons, Ltd., soap and chemical manufacturers, Bank Quay, Warrington. The explosion is understood to have been in the oil plant. No one was hurt.

### Iron and Steel Prices Amended

A new Order amending maximum prices for a limited range of iron and steel products—the principal of which is terneplate—has been made by the Minister of Supply. The Order, the Iron and Steel Prices (No. 5) Order, 1950, came into operation on 14 December.

### Tin Prices Firmer

After erratic movements on 12 December when the cash price of tin fell by £5 and three-months was reduced by £42 10s., the London Tin Market became steadier. Both cash and forward quotations finished with net gains on 18 December, the former rising £32 10s. to £1225-1230 and three months increasing by £12 10s. to £1050-£1055 per ton.

### Court Appointment

One of six new appointments announced by the Court of the University of Durham on 14 December was that of Mr. R. W. Gregory to an Imperial Chemical Industries Fellowship.

### Electrical Power Exhibition

The Electrical Power Exhibition is being held at Glasgow's Engineering Centre from December 21 to January 12. It presents a selection of exhibits illustrating recent developments connected with the generation and utilisation of electrical energy. The exhibits themselves have been carefully chosen to interest a wide public and are arranged in the following sections: boilers and combustion, generation, transmission, various applications of electricity, water cooling.

### Temporary Transfer

Mr. E. M. Price Holmes has been temporarily transferred to one of the Beecham Group's South American subsidiaries, and in view of the length of his projected stay overseas has resigned from the board.

### Directors Appointed

Mr. J. G. Lewis and Mr. F. E. Vernalls have been appointed as directors to the Board of G. E. Simm (Machinery), Ltd., to take effect from 1 January 1951.

### New Edition of Benzole Specifications

The third edition of "Standard Specifications for Benzole and Allied Products" will be available very shortly. A committee fully representative of the whole industry is responsible for the book and the view of users of the products are given every consideration. Priced at 15s. 9d., post free, it will be obtainable on a prepaid order from the National Benzole Association, Wellington House, Buckingham Gate, London, S.W.1.

### Director's Will

John Maclean Henry, of Midgham, Thatcham, Berkshire, late joint managing director of Colthrop Board and Paper Mills Ltd., Thatcham, left £157,779.

### Copper Supplies Restricted

Imported virgin copper supplies are to be restricted from 1 January, 1951 until further notice, it was announced by the Ministry of Supply last week. Supplies to consumers will be restricted to a total each month equal to their average monthly consumption in the first half of 1950.

Individual quotas will be notified to consumers by the Directorate of Non-Ferrous Metals, Rugby. The quota for each consumer will be based on the returns of consumption of imported virgin copper made to the Bureau of Non-Ferrous Metal Statistics.

Consumers of imported electrolytic copper in special shapes and to special specification, for instance vertically cast wire bars or 1,000 lb. vertically cast cakes, will be restricted to a monthly quota of two-thirds of their average monthly consumption of these shapes in the first half of 1950. The short delivery of one-third of special shapes may be made up, if the consumer so desires, by deliveries of standard shapes subject to the overall limitation on supplies.

No further delivery contracts will be made until the quotas have been notified.

# OVERSEAS

### West German Paint Output

Output of the West German paint industry this year is expected to amount to approximately 190,000 tons, valued at roughly 500 million German marks. This represents an increase of 30 per cent over the 1949 figure. The industry, however, at present contributes only 1.5 per cent to total exports. The Association of West German Paint Manufacturers (which embraces also units in Western Berlin) comprises some 500 works.

### Japanese Asbestos Output Higher

Japan produced 6013 short tons of asbestos in 1949, compared with 5300 short tons in 1948.

### Milan to Como Pipeline

The Societa Nazionale Metanodotti is about to complete a methane gas pipe-line from Milan to Como whence it is to be extended to Switzerland. According to a Swiss Press report, agreements have already been concluded envisaging the supply of 1 million cubic metres of methane gas per day to the Canton Ticino.

### To Buy Insecticides

The Egyptian cotton industry has been allocated the sum of £500,000 for the purchase of insecticides to be expended during the new cotton season.

### French Guiana Bauxite

Active prospecting work is reported to be in progress in French Guiana (Cayenne) where important bauxite deposits have been found some time ago.

### Polish Potassium Discovery

The Geological Research Institute of Warsaw is reported to have recently discovered a new and important deposit of potassium salts in the Kujavian region of Poland.

### Bauxite in French West Africa

Relatively important occurrences of silicate-bauxite have been found in the Niandan-Banie region of French West Africa, between Niger and Tinkisso, to the north of Kouroussa. The deposits are said to be very similar to those on the Gold Coast. Surface tests had a contents of 52.3 to 71.8 per cent $Al_2O_3$, 0.4 to 22.3 per cent $Fe_2O_3$ and 0.3 to 0.9 per cent $SiO_2$.

### Turkish Chrome for Germany

Western Germany has recently placed an order for 1000 tons of second-grade Turkish chrome ore. Germany was in former years the leading buyer of Turkish chrome-ore, but purchases have been insignificant since 1945.

### German Water Purifier

A new product, "Decarbolith" developed by the Schwarzheide works in the East German Republic from dolomite occurring in the Gera region, is reported to be a new and effective means of purifying drinking water and water for industrial purposes.

### Employees Present Shield

To honour the 250th anniversary of the founding of the firm, the employees of Boileau and Boyd, Ltd., manufacturing chemists and druggists, of Dublin, have presented to the directors an inscribed shield bearing silver insignia of pharmacy and medicine.

### Britain's Oil Consumption

Great Britain is now consuming oil products at the rate of about 18 million tons a year, but very little crude oils is produced here and less than one-third of our annual consumption is refined in the country. Practically all the oil, crude and refined, is being imported from the Caribbean area and from the Middle East. The British oil industry, however, is now in the midst of the most important period of development and expansion in its history; for out of the old industry, which before the war was mainly engaged in marketing products, a new one is emerging that will be capable of refining imported crude oil on a scale large enough to satisfy almost entirely the total home demand.

It is expected that by the end of 1953, when the present refinery building programme—representing the investment of about £125 million—is due to be completed, the country's total petroleum production will be in the region of 20 million tons a year, compared with the figure of 3,500,000 tons in 1948. Thus we are in sight of being completely independent of foreign refineries for the oil products upon which our industrial civilisation depends in peace and war.

By far the largest single project in this refinery development programme is the Anglo-American Oil Company's new plant. It will cost about £37,500,000, and when the refinery is completed—it is due to start up on 1 January, 1952—the annual output of petroleum products is expected to be 5,500,000 tons, including a daily production of one million gallons of high grade motor spirit. The development is due entirely to private enterprise, the total cost being met by the company without recourse to E.C.A. dollars.

# Technical Publications

**CHROMATOGRAPHY**—its recent developments, use in inorganic analyses, and medical applications—are dealt with in three papers to be found in the December issue of "The Advancement of Science" (VII,27) published by the British Association. Other reports of special interest to the chemist, concern the chemistry of muscular contraction, low temperature phenomena and higher technological education, while for all scientists, the lecture by Sir Lawrence Bragg "Science and the Adventure of Living," given at the Royal Institution on 25 October, should prove interesting reading.

**BIOSYNTHESIS** of Vitamin C during germination is the subject of an article by A. Sreenivasan and S. D. Wandrekar, which appears in the October issue of the *Proceedings of the Indian Academy of Sciences* (XXXII, 4, Section B). In section A of the same journal, a number of papers on chemical research are given, including "Studies in Oxycellulose, parts 3 and 4"; "Anthraquinone and Anthrone Series, parts 5 and 6"; "Thermal Expansion of Crystals"; "Nuclear Oxidation in Flavones and Related Compounds, part 31" and "Synthetic Experiments in the Benzopyrone Series, part 13."

**THE TEXTILE** Institute and the Society of Dyers & Colourists have jointly published Volume I of "Review of Textile Progress," relating particularly to progress made in 1949.

Edited by W. J. Hall, A.R.C.S., B.Sc., and C. J. W. Hooper, Ph.D., D.I.C., A.R.C.S., (of the Institute and the Society respectively), the review—running to 342 pages—is the work of 24 authors, all experts in the sections for which they are responsible. The publication costs £1 and is available from the Textile Institute, 16 St. Mary's Parsonage, Manchester, 3. Subjects and contributors are: Introduction, G. S. J. White, B.A., F.T.I.; Physics and Chemistry of Fibrous Materials, R. Meredith, M.Sc.; Cotton and Cellulose Chemistry, S. M. Neale, D.Sc.; Physics of Wool and Silk, G. King, M.Sc.; Wool and Silk Chemistry, J. B. Speakman, D.Sc., F.R.I.C., F.T.I.; Physics and Chemistry of Rayon, D. Entwistle, B.Sc., A.R.I.C.; Physics and Chemistry of Bast Fibres, H. J. Callow, B.Sc., Ph.D., A.R.I.C.; Silk Production, F. O. Howitt, M.Sc., Ph.D., F.R.I.C., F.T.I.; Wool Production, A. B. Wildman, B.Sc., Ph.D.; Fibre Production-Cotton (including Kapok), E. Lord, B.Sc.; Long Vegetable Fibres, A. J. Turner, C.B.E., M.A., D.Sc., F.T.I.; Rayon, H. J. Hegan, B.Sc., F.R.I.C.; Conversion of Fibres into Finished Yarns, J. G. Martindale, B.Sc., Ph.D., A.Inst.P., F.T.I.; Knitting, J. Chamberlain, F.T.I.; Fabrics, J. Pollitt, B.Sc.; Colouring Matters, J. Baddiley; Dyeing, H. A. Turner, M.Sc., F.R.I.C., F.T.I.; Textile Printing, R. J. Hannay, B.Sc., F.R.I.C.; Finishing Wool Fabrics, C. Whewell, B.Sc., Ph.D., F.R.I.C., F.T.I.; Finishing, R. A. McFarlane; Analysis, Testing, Grading and Defects, S. L. Anderson, B.Sc., A.Inst.P.; Textile Microscopy, A. B. Wildman, B.Sc., Ph.D., and H. M. Appleyard, A.T.I.; Laundering and Dry Cleaning, F. Courtney Harwood, B.Sc., F.R.I.C., M.I.Chem.E., F.T.I.; Mill Engineering, N. H. Chamberlan, B.Sc., Ph.D.

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**A new simplified "sleeve-packed" cock, to replace taper plug cocks for pressure gauges, instrument connections, etc. Tested hydraulically to 1000 p.s.i., the valve is said to give reliable service and easy maintenance under exacting conditions. It is available in six different patterns. Fuller details of patterns and sizes are to be found in an explanatory leaflet obtainable from the manufacturers, Richard Klinger, Ltd., Klingerit Works, Sidcup, Kent.**

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### Fifty Years' Service

Mr. C. A. Wylie has just celebrated 50 years' service with the Liver Grease, Oil and Chemical Company, of Liverpool. Aged 72, he is the company's chairman, and to mark the occasion, he entertained the staff. He is a member of the council of the British Association of Chemists, and three years ago was awarded the Hinchley Medal for outstanding services to chemistry.

# The Chemist's Bookshelf

FORENSIC SCIENCE AND LABORATORY TECHNICS. Ralph F. Turner. 1949, Springfield, Illinois: Charles C. Thomas. Oxford: Blackwell Scientific Publications, Ltd. Pp. xxv + 240. Figs. 82. $6.50.

In this country, while courses in forensic medicine and medical jurisprudence are a part of the training for certain professional qualifications, and are hence included in the curricula of universities, courses in other branches of forensic science, as such, are not generally recognised. The forensic medicine course must, of necessity, touch on certain aspects of other branches of science, and in particular of chemistry. At various centres *ad hoc* courses for the training of police officers are given. But otherwise, those wishing to become proficient in any of the branches of forensic science must rely largely on a limited number of standard works and on self-training.

Matters are apparently quite different in the United States, since it is claimed that the present book is intended " as a teaching laboratory manual for colleges, universities or police departments training students for forensic science."

The field covered is very wide. As a consequence, in each section, to quote from the chapter on Documents, " if a student desires to specialise to such an extent that he can become proficient in this branch of scientific investigation, he must be willing to devote himself to an extensive study of the literature; to a period of training under a qualified examiner; and to a complete study of all phases (of the subject) and numerous other related questions. The following programme does not begin to scratch the surface of such a course of study, but is designed only to give the student some insight into typical . . . problems and the mode of attack necessary for correct solution."

Such a statement is in itself a salutary reminder that in this, as in any other *general elementary* course, there can be no expectation that there will emerge at the end a finished high-grade scientist, ready to tackle with fictional ease any or all of the problems of scientific detection that may be put into his hands. Nevertheless, any student of science or any scientist who conscientiously follows the well-chosen series of laboratory exercises given in this book (preferably, as the author envisages, under the direction of a qualified instructor) will benefit enormously thereby. He will almost certainly have been impressed with the necessity, if he is to become first class, of ultimate specialisation. And he will have the broad background without which specialisation would not be justified.

The general reader will find this well laid out and excellently illustrated book an interesting scientific, as opposed to a popular, approach to the subject. Most of it is simple enough to be comprehended by a reader with an average school science background.

The claim of the book, however, to act as a practical text and reference for investigators in the field is hardly justified, except in so far as any scientist will benefit, from time to time, by browsing through an elementary laboratory manual dealing with his speciality.

The section of the book devoted to chemistry is almost entirely concerned with toxicology. Elsewhere in the book a few other chemical procedures are included in appropriate places.—C.L.W.

## Alkyl Chlorides in U.K.

THE FIRST commercial production in the U.K. of the higher alkyl chlorides is claimed by Leda Chemicals, Ltd., of Wharf Road, Ponders End, Middlesex. This is the first time that these products have been produced commercially outside the U.S.A.

Lauryl, cetyl and stearyl chlorides are among the Leda products. These are valuable intermediates in the manufacture of quaternary ammonium compounds and other cationic surface active agents, and also the higher alkyl mercaptans, amines and nitriles.

An interesting development is the new production of specialised quaternary ammonium and pyridinium compounds made to specification for pharmaceutical houses, who have for long been looking for a U.K. source of these materials.

# Law and Company News

## Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

### Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

DARGUE INDUSTRIALS, LTD. (formerly DARGUE ACETYLENE GAS CO., LTD.), Newcastle-on-Tyne. (M., 30/12/50). 20 November, mortgage to Portland Building Society, securing £2800 and further advances; charged on 70, 72, 74 and 76 City Road, Newcastle-on-Tyne. *£1990. 17 December, 1949.

TRAGASOL PRODUCTS, LTD., Hooton, gum manufacturers. (M., 30/12/50). 23 November, deb. to Martins Bank, Ltd., securing all moneys due or to become due to the bank; general charge. *£9000. 3 January, 1950.

EXPANDED ALUMINIUM PRODUCTS (READING), LTD., London, E.C. (M., 30/12/50). 22 November, £300 debs., part of a series already reg.

### Increases of Capital

The following increases of capital have been announced: SHAKE SALT AND CHEMICAL CO., LTD., from £3000 to £125,218; W. J. BUSH AND CO., LTD., from £750,000 to £800,000; SPENCER (BANBURY), LTD., from £250,000; TODDINGTON ESTATES, LTD., from £150 to £50,000.

## New Registrations

**Procter, Johnson & Co., Ltd.**
Private company. (489,482). Reg. 15 December. Capital £20,000. Manufacturers of colours and chemicals. Directors: J. Procter, J. C. Procter and G. Procter. Reg. office: Excelsior Works, Bank Street, Clayton, Manchester.

**Thomas Reid (Chemists), Ltd.**
Private company. (489,452). Capital £5000. Retail and wholesale chemists and druggists, etc. Directors: T. Reid, W. M. Reid and W. A. Reid. Reg. office: 28 Station Road, Harpenden, Herts.

**Rusco, Ltd.**
Private company. (489,486). Capital £1000. Analytical, manufacturing, pharmaceutical and general chemists, etc. Directors: E. E. Russell and M. V. Russell. Reg. office: The West Wynd, Letchworth, Herts.

**J. E. R. Simons, Ltd.**
Private company. (489,548). Capital £100. Manufacturers of and dealers in insecticides, fungicides, fertilisers, etc. Directors: J. E. R. Simons and Roy E. Simons. Reg. office: Natts Farm, Potter Street, nr. Harlow, Essex.

## Leverhulme Memorial Lecture

THE BASIC principles underlying discovery, are the objective outlook engendered by the discipline of research, accuracy of experimentation and clear thinking in other words, scientific integrity. This was the substance of the third Leverhulme Memorial Lecture given by Professor T. P. Hilditch at Liverpool University.

Citing as an example the work of two University bio-chemists, Professor Hilditch spoke of the close relationship between academic and technical development. At the beginning of the century there had been a striking contrast between the highly-developed state of the soap industry, and the lack of basic knowledge about the constitution of fats.

Two of the four main soap factories at Port Sunlight, for instance, must have been in production before the chemical constitution of oleic acid, the most important soap-making material, had been finally settled. This leeway had been amply made up in the last 50 years, in which more fundamental knowledge about fats had been gained than in the whole of the preceding century. The advances made between 1900 and 1950 fell a little short of even that high standard of achievement which Lord Leverhulme demanded from himself, and looked for in his fellow-workers.

### Unsettled Tin Prices

Following the record prices quoted on the London Metal Exchange on 19 December there was a reaction on 20 December when spot metal was quoted at £1260-£1270, a reduction of £37 10s. On 21 December there was a recovery, though the final quotations were still down on balance, cash being £1250 and three months £1112 10s.

# Prices of British Chemical Products

## *Acetone and Copper Sulphate Dearer*

**London.** — Owing to the Christmas holiday, business on the chemicals market has been very restricted and chief interest has centered on contract replacements. The overall movement prior to the holiday was fairly substantial with consumers' delivery specifications covering the full extent of their contracts and the demand in almost all sections remains strong. So far as prices are concerned the year is finishing on a very firm note and supply difficulties which are already apparent are almost certain to bring about price increases. In the coal tar products market the year has closed on a brisk trade with most products displaying a firm undertone.

**Manchester.**—Since the tail end of last week, business for heavy chemical products, in regard both to contract deliveries and to fresh bookings, has been virtually at a standstill. Only a moderate weight of new orders has been reported since the re-opening of the market. Deliveries of alkalis and other leading products have been resumed on a fair scale and should be back to normal in the early days of next week. Active conditions in most sections of the market are also anticipated for the tar products.

**Glasgow.**—Business is mainly concerned with putting forward contracts for next year, although in many instances chemicals are in such short supply, largely owing to the sulphur and sulphuric acid position, that advance orders are not a possibility. Export business remains dull also owing to shortage of supplies.

### Price Changes

**Rises:** Acetone, copper sulphate, lactic acid, mercuric chloride, tartaric acid, ammonium sulphate, compound fertilisers, cresylic acid.

### General Chemicals

**Acetic Acid.**—Per ton : 80% technical, 1 ton, £69 ; 80% pure, 1 ton, £74 ; commercial glacial 1 ton, £82 ; delivered buyers' premises in returnable barrels ; in glass carboys, £7 ; demijohns, £11 extra.

**Acetic Anhydride.**—Ton lots d/d, £118 per ton.

**Acetone.**—Small lots : 5 gal. drums, £105 per ton ; 10 gal. drums, £100 per ton. In 40/50 gal. drums less than 1 ton, £85 per ton ; 1 to 9 tons, £84 per ton ; 10 to 50 tons, £83 per ton ; 50 tons and over, £82 per ton.

**Alcohol, Industrial Absolute.**—50,000 gal. lots, d/d, 2s. 5d. per proof gallon ; 5000 gal. lots, d/d, 2s. 6½d. per proof gal.

**Alcohol, Diacetone.**—Small lots : 5 gal. drums, £133 per ton ; 10 gal. drums, £128 per ton. In 40/45 gal. drums : less than 1 ton, £113 per ton ; 1 to 9 tons, £112 per ton ; 10 to 50 tons, £111 per ton ; 50 to 100 tons, £110 per ton ; 100 tons and over, £109 per ton.

**Alum.**—Loose lump, £17 per ton, f.o.r. MANCHESTER : Ground, £17 10s.

**Aluminium Sulphate.**—Ex works, £11 10s. per ton d/d. MANCHESTER : £11 10s.

**Ammonia, Anhydrous.**—1s. 9d. to 2s. 3d. per lb.

**Ammonium Bicarbonate.**—2 cwt. non-returnable drums ; 1 ton lots £47 per ton.

**Ammonium Carbonate.**—1 ton lots ; MANCHESTER : Powder, £52 d/d.

**Ammonium Chloride.** — Grey galvanising, £27 10s. per ton, in casks, ex wharf. Fine white 98%, £21 10s. to £22 10s. per ton. See also Salammoniac.

**Ammonium Nitrate.**—D/d, £18 to £20 per ton.

**Ammonium Persulphate.** — MANCHESTER : £5 2s. 6d. per cwt. d/d.

**Ammonium Phosphate.**—Mono- and di-, ton lots, d/d, £78 and £76 10s. per ton.

**Amyl Acetate.**—In 10-ton lots, £179 10s. per ton.

**Antimony Oxide.**—£220 per ton.

**Antimony Sulphide.**—Golden, d/d in 5 cwt. lots as to grade, etc., 1s. 9¼d. to 2s. 4¾d. per lb. Crimson, 2s. 6¼d., to 3s. 3½d. per lb.

**Arsenic.**—Per ton, £44 5s. to £47 5s., ex store.

**Barium Carbonate.**—Precip., d/d ; 2-ton lots, £27 5s. per ton, bag packing, ex works.

**Barium Chloride.**—£35 to £35 10s. per ton.

**Barium Sulphate (Dry Blanc Fixe).**—Precip., 4-ton lots, £29 10s. per ton d/d ; 2-ton lots, £29 15s. per ton.

**Bleaching Powder.**—£19 10s. per ton in casks (1 ton lots).

**Borax.**—Per ton for ton lots, in free 140 lb. bags, carriage paid: Anhydrous, £54; in 1-cwt. bags, commercial, granular, £34 10s.; crystal, £37; powder, £38, extra fine powder, £39; B.P., granular, £44; crystal, £46; powder, £48-£48 10s.; extra fine powder £48.

**Boric Acid.**—Per ton for ton lots in free 1-cwt. bags, carriage paid: Commercial, granular, £62; crystal, £69; powder, £66 10s.; extra fine powder, £68 10s.; B.P., granular, £75 10s.; crystal, £81; powder, £78 10s.; extra fine powder, £80 10s.

**Butyl Acetate BSS.**—£156 10s. per ton, in 10-ton lots.

**Butyl Alcohol BSS.**—£143 per ton, in 10-ton lots.

**Calcium Bisulphide.**—£6 10s. to £7 10s. per ton f.o.r. London.

**Calcium Chloride.**—70/72% solid £9 12s. 6d. per ton, in 4-ton lots.

**Charcoal, Lump.**—£25 per ton, ex wharf. Granulated, £30 per ton.

**Chlorine, Liquid.**—£28 10s. per ton d/d in 16/17-cwt. drums (3-drum lots).

**Chrometan.**—Crystals, 6d. per lb.

**Chromic Acid.**—1s. 10d. to 1s. 11d. per lb., less 2½%, d/d U.K.

**Citric Acid.**—Per lb., d/d buyers' premises, for 5 cwt. or over, anhydrous, 1s. 7d. plus 10%, other, 1s. 7d.; 1 to 5 cwt., anhydrous 1s. 7½d. plus 10%, other 1s. 7½d. Higher prices for smaller quantities. All subject to a trade discount of 5%.

**Cobalt Oxide.**—Black, delivered, 9s. 10d. per lb.

**Copper Carbonate.**—MANCHESTER: 2s. per lb.

**Copper Chloride.**—(63%), d/d, 2s. 2d. per lb.

**Copper Oxide.**—Black, powdered, about 1s. 4½d. per lb.

**Copper Nitrate.**—(63%), d/d, 2s. 1d. per lb.

**Copper Sulphate.**—£64 15s. per ton f.o.b., less 2%, in 2-cwt. bags.

**Cream of Tartar.**—100%, per cwt., about £8 17s. per 10 cwt. lot, d/d.

**Ethyl Acetate.**—10 tons and upwards, d/d, £114 per ton.

**Formaldehyde.**—31 per ton in casks, according to quantity, d/d. MANCHESTER: £32.

**Formic Acid.**—85%, £66 to £67 10s. per ton, carriage paid.

**Glycerin.**—Chemically pure, double distilled 1,260 s.g. 227s. 6d.—230s. 6d. per cwt. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

**Hexamine.**—Technical grade for commercial purposes, about 1s. 4d. per lb.; free-running crystals are quoted at 2s. 1d. to 2s. 3d. per lb.; bulk carriage paid.

**Hydrochloric Acid.**—Spot, 7s. 6d. to 8s. 9d. per carboy d/d, according to purity, strength and locality.

**Hydrofluoric Acid.**—59/60%, about 1s. to 1s. 2d. per lb.

**Hydrogen Peroxide.**—1s. 0½d. per lb. d/d, carboys extra and returnable.

**Iodine.**—Resublimed B.P., 18s. per lb. in cwt. lots.

**Iodoform.**—21s. per lb.

**Iron Sulphate.**—F.O.R. works, £3 15s. to £4 per ton.

**Lactic Acid.**—Pale tech., £105 per ton; dark tech., £95 per ton ex works; barrels returnable.

**Lead Acetate.**—White: £146 10s. per ton.

**Lead Carbonate.**—Nominal.

**Lead Nitrate.**—£127 10s. per ton.

**Lead, Red.**—Basis prices per ton: Genuine dry red lead, £154; orange lead, £166. Ground in oil: red, £173 10s.; orange, £185 10s.

**Lead, White.**—Basis prices: Dry English, in 8-cwt. casks, £161 per ton. Ground in oil: English, under 2 tons, £177 10s.

**Lime Acetate.**—Brown, ton lots, d/d, £18 to £20 per ton; grey, 80-82%, ton lots, d/d, £22 to £25 per ton.

**Litharge.**—£154 per ton.

**Lithium Carbonate.**—7s. 9d. per lb. net.

**Magnesite.**—Calcined, in bags, ex works, £27.

**Magnesium Carbonate.**—Light, commercial, d/d, £74 5s.; cwt. lots £82 10s. per ton d/d.

**Magnesium Chloride.**—Solid (ex wharf), £15 per ton.

**Magnesium Oxide.**—Light, commercial, d/d, £187; cwt. lots £192 10s. per ton d/d.

**Magnesium Sulphate.**—£12 to £14 per ton.

**Mercuric Chloride.**—Per lb., lump, 10s. 8d.; smaller quantities dearer.

**Mercury Sulphide, Red.**—Per lb., from 10s. 3d. for ton lots and over to 10s. 7d. for lots of 7 to under 30 lb.

**Methanol.**—Pure synthetic, d/d, £28 to £38 per ton.

**Methylated Spirit.**—Industrial 66° O.P. 100 gals., 4s. 2d. per gal.; pyridinised 64° O.P. 100 gal., 4s. 4d. per gal.

**Nickel Sulphate.**—F.o.r. works, 3s. 4d. per lb. (Nominal.)

**Nitric Acid.**—£24 to £26 per ton, ex works.

**Oxalic Acid.**—About £133 per ton packed in free 5-cwt. casks.

**Paraffin Wax.**—From £58 10s. to £101 17s. 6d., according to grade for 1-ton lots.

**Phosphoric Acid.**—Technical (S.G. 1.500), ton lots, carriage paid, £63 10s. per ton ; B.P. (S.G. 1.750), ton lots, carriage paid, 1s. 1½d. per lb.

**Phosphorus.**—Red, 3s. per lb. d/d ; yellow, 1s. 10d. per lb. d/d.

**Potash, Caustic.**—Solid, £65 10s. per ton for 1-ton lots ; flake, £76 per ton for 1-ton lots. Liquid, d/d, nominal.

**Potassium Bichromate.**—Crystals and granular, 9⅜d. per lb. ; ground, 10⅜d. per lb., for not less than 6 cwt. ; 1-cwt. lots, ½d. per lb. extra.

**Potassium Carbonate.**—Calcined, 98/100%, £64 per ton for 1-ton lots, ex store ; hydrated, £58 for 1-ton lots.

**Potassium Chlorate.**—Imported powder and crystals, nominal.

**Potassium Chloride.**—Industrial, 96%, 6-ton lots, £16 10s. per ton.

**Potassium Iondide.**—B.P., 15s. 5d. per lb. in cwt. lots.

**Potassium Nitrate.**—Small granular crystals, 76s. per cwt. ex store, according to quantity.

**Potassium Permanganate.**—B.P., 1s. 7½d. per lb. for 1-cwt. lots ; for 3 cwt. and upwards, 1s. 6d. per lb. ; technical, £6 13s. to £7 13s. per cwt. ; according to quantity d/d.

**Potassium Prussiate.**—Yellow, nominal.

**Salammoniac.**—Dog-tooth crystals, £72 10s. per ton ; medium, £67 10s. per ton ; fine white crystals, £21 10s. to £22 10s. per ton, in casks.

**Salicylic Acid.**—MANCHESTER : 2s. to 3s. 4½d. per lb. d/d.

**Soda Ash.**—58% ex depôt or d/d, London station, £8 17s. 3d. to £10 14s. 6d. per ton.

**Soda, Caustic.**—Solid 76/77% ; spot, £18 4s. per ton d/d.

**Sodium Acetate.**—£49-£55 per ton.

**Sodium Bicarbonate.**—Refined, spot, £11 per ton, in bags.

**Sodium Bichromate.**—Crystals, cake and powder, 8d. per lb. ; anhydrous, 7½d. per lb., net, d/d U.K. in 7-8 cwt. casks.

**Sodium Bisulphite.**—Powder, 60/62%, £29 12s. 6d. per ton d/d in 2-ton lots for home trade.

**Sodium Carbonate Monohydrate.**—£25 per ton d/d in minimum ton lots in 2-cwt. free bags.

**Sodium Chlorate.**—£52 to £57 per ton.

**Sodium Cyanide.**—100% basis, 8d. to 9d. per lb.

**Sodium Fluoride.**—D/d, £4 10s. per cwt.

**Sodium Hyposulphite.**—Pea crystals £23 2s. 6d. a ton ; commercial, 1-ton lots, £21 12s. 6d. per ton carriage paid.

**Sodium Iodide.**—B.P., 16s. 9d. per lb., in cwt. lots.

**Sodium Metaphosphate (Calgon).**—Flaked, loose in metal drums, £101 10s. ton.

**Sodium Metasilicate.**—£19 to £19 5s. per ton, d/d U.K. in ton lots.

**Sodium Nitrate.**—Chilean Industrial, 97-98%, 6-ton lots, d/d station, £23 per ton.

**Sodium Nitrite.**—£29 10s. per ton.

**Sodium Percarbonate.**—12½% available oxygen, £7 17s. 9d. per cwt. in 1-cwt. drums.

**Sodium Phosphate.**—Per ton d/d for ton lots : Di-sodium, crystalline, £32 10s., anhydrous, £65 ; tri-sodium, crystalline, £32 10s., anhydrous, £64.

**Sodium Prussiate.**—9d. to 9½d. per lb. ex store.

**Sodium Silicate.**—£6 to £11 per ton.

**Sodium Silicofluoride.**—Ex store, nominal.

**Sodium Sulphate (Glauber Salt).**—£8 per ton d/d.

**Sodium Sulphate (Salt Cake).**—Unground. £6 per ton d/d station in bulk. MANCHESTER : £6 10s. per ton d/d station.

**Sodium Sulphide.**—Solid, 60/62%, spot. £25 15s. per ton, d/d, in drums ; broken, £27 5s. per ton, d/d, in casks.

**Sodium Sulphite.**—Anhydrous, £29 10s. per ton ; pea crystals, £20 10s. per ton d/d station in kegs ; commercial, £12 to £14 per ton d/d station in bags.

**Sulphur.**—Per ton for 4 tons or more, ground, £15 11s. 6d. to £17 16s. 6d. according to fineness.

**Sulphuric Acid.**—168° Tw., £7 5s. 6d. to £8 5s. 6d. per ton ; 140° Tw., arsenic free £5 10s. per ton ; 140° Tw., arsenious, £5 2s. 6d. per ton ; Quotations naked at sellers' works.

**Tartaric Acid.**—Per cwt. : 10 cwt. or more, £10.

**Tin Oxide.**—1-cwt. lots d/d £25 10s. (Nominal.)

**Titanium Oxide.**—Comm., ton lots, d/d (56-lb. bags), £102 per ton.

**Zinc Oxide.**—Maximum price per ton for 2-ton lots, d/d ; white seal, £142 ; green seal, £141 ; red seal, £139 10s.

**Zinc Sulphate.**—Nominal.

### Rubber Chemicals

**Antimony Sulphide.**—Golden, 4s. to 5s. per lb. Crimson, 2s. 7½d. to 3s. per lb.

**Arsenic Sulphide.**—Yellow, 1s. 9d. per lb.

**Barytes.**—Best white bleached, £11-£11 10s. per ton.

**Cadmium Sulphide.**—6s. to 6s. 6d. per lb.

**Carbon Bisulphide.**—£37 to £41 per ton, according to quality, in free returnable drums.

**Carbon Black.**—6d. to 8d. per lb., according to packing.

**Carbon Tetrachloride.**—£59 10s. per ton.

**Chromium Oxide.**—Green, 2s. per lb.

**India-rubber Substitutes.**—White, 10½d. to 1s. 5½d. per lb. ; dark, 10½d. to 1s. per lb.

**Lithopone.**—30%, £44 2s. 6d. per ton.

**Mineral Black.**—£7 10s. to £10 per ton.

**Mineral Rubber, "Rupron."**—£20 per ton.

**Sulphur Chloride.**—7d. per lb.

**Vegetable Lamp Black.**—£49 per ton.

**Vermillion.**—Pale or deep, 15s. 6d. per lb. for 7-lb. lots.

### Nitrogen Fertilisers

**Ammonium Sulphate.**—Per ton in 6-ton lots, d/d farmer's nearest station, £12 14s.

**Compound Fertilisers.**—Per ton d/d farmer's nearest station, I.C.I. Special No. 1, £20 6s. 6d.

**"Nitro-Chalk."**—£12 9s. 6d. per ton in 6-ton lots, d/d farmer's nearest station.

**Sodium Nitrate.**—Chilean for 6-ton lots d/d nearest station, £19 17s. 6d. per ton.

### Coal-Tar Products

**Benzol.**—Per gal, ex works : 90's, 3s. 3d. ; pure, 3s. 5½d. ; nitration grade, 3s. 7½d.

**Carbolic Acid.**—Crystals, 1s. 1d. to 1s. 3d. per lb. Crude, 60's, 4s. 3d. MANCHESTER : Crystals, 11½d. to 1s. 1½d. per lb., d/d crude, 4s. 3d., naked, at works.

**Creosote.**—Home trade, 7d. to 10½d. per gal., according to quality, f.o.r. maker's works. MANCHESTER : 6½d. to 9¾d. per gal.

**Cresylic Acid.**—Pale 98%, 3s. 3d. per gal. ; 99.5/100%, 3s. 11d. American, duty free, for export, 9s. 0d., naked at works. MANCHESTER : Pale, 99/100%, American, duty free, 7s. per gal.

**Naphtha.**—Solvent, 90/160°, 2s. 10d. per gal. for 1000-gal. lots ; heavy, 90/190°, 2s. 4d. per gal. for 1000-gal. lots, d/d. Drums extra : higher prices for smaller lots. Controlled prices.

**Naphthalene.**—Crude, ton lots, in sellers' bags, £9 1s. to £12 13s. per ton according to m.p. ; hot-pressed, £14 15s. to £15 14s. per ton, in bulk ex works ; purified crystals, £28 to £43 5s. per ton. Controlled prices.

**Pitch.**—Medium, soft, home trade, 90s. per ton f.o.r. suppliers' works ; export trade, 120s. per ton f.o.b. suppliers' port. MANCHESTER : £5 10s. f.o.r.

**Pyridine.**—90/160°, 22s. 6d. MANCHESTER : 20s. to 22s. 6d. per gal.

**Toluol.**—Pure, 3s. 2¼d. per gal. MANCHESTER : Pure, 3s. 2d. per gal. naked.

**Xylol.**—For 1000-gal. lots, 4s. 0½d. to 4s. 3d. per gal., according to grade, d/d.

### Wood Distillation Products

**Calcium Acetate.**—Brown, £15 per ton ; grey, £22.

**Methyl Acetone.**—40/50%, £56 to £60 per ton.

**Wood Creosote.**—Unrefined, from 3s. 6d. per gal., according to boiling range.

**Wood Naphtha.**—Miscible, 4s. 6d. to 5s. 6d. per gal. ; solvent, 5s. 6d. to 6s. 6d. per gal.

**Wood Tar.**—£6 to £10 per ton.

### Intermediate and Dyes
### (Prices Nominal)

*m*-**Cresol** 98/100%.—Nominal.

*o*-**Cresol** 30/31° C.—Nominal.

*p*-**Cresol** 34/35° C.—Nominal.

**Dichloraniline.**—2s. 8½d. per lb.

**Dinitrobenzene.**—8½d. per lb.

**Dinitrotoluene.**—48/50° C., 9½d. per lb. ; 66/68° C., 1s.

*p*-**Nitraniline.**—2s. 11d. per lb.

**Nitrobenzene.**—Spot, 5½d. per lb. in 90-gal. drums, drums extra, 1-ton lots d/d buyers' works.

**Nitronaphthalene.**—1s. 2d. per lb. ; P.G. 1s. 0½d. per lb.

*o*-**Toluidine.**—1s. per lb., in 8/10-cwt. drums, drums extra.

*p*-**Toluidine.**—2s. 2d. per lb., in casks.

*m*-**Xylidine Acetate.**—4s. 5d. per lb., 100%.

### Latest Oil Prices

**London:** 22 December. The prices of unrefined oils remain unchanged for the four week period ending 1 January, 1951. The prices of refined oils remain unchanged for the eight week period ending 27 January, 1951.

# Chemical and Allied Stocks and Shares

STOCK markets have closed the year on a firm note, although international uncertainties restricted business and movements generally have been small and indefinite. Sentiment in regard to industrial shares remains under the influence of the various dividend increases announced recently by companies whose profits have expanded largely as a result of their drive in export markets. These increases are regarded as fully justified.

An end of the policy of rigid limitation of dividends is expected, but it is thought that Mr. Gaitskell will emphasise that in any case moderation and restraint in dividend payments must be followed. This would of course not rule out the prospect of somewhat higher payments from companies which have been able to increase earnings. There are indications, however, that companies which can earn more in 1951 will be the exception because higher taxation seems inevitable, moreover, the rising trend in prices of materials and commodities does not appear to have reached its peak.

The possibility of slightly higher dividends has tended to draw attention to some industrial shares and industrials generally are now at levels above those ruling at the end of 1949. In nearly all cases current prices are well below best levels reached in 1950. War Loan 3½ per cent is now 94¼, which compares with 92⅝ a year ago; highest and lowest levels in 1950 were 97 15/16 and 90 respectively.

Imperial Chemical, which were 42s. 9d. a year ago, are 42s. 7½d. at the time of writing; highest and lowest levels in 1950 have been 44s. 3d. and 39s. 6d. I.C.I. has made a big note issue during the year, but despite this increased capital, the market is confidently expecting that the 10 per cent dividend will be maintained on the ordinary shares. Monsanto were 51s. 3d. a year ago, and are now 50s. The year's extremes were 52s. and 46s. Fisons, now 25s. 6d., have had highest and lowest of 29s. and 19s. 3d. in the year.

Laporte Chemicals 5s. units moved between 11s. and 9s. 3d. during the year and are now 10s. 3d. Brotherton 10s. shares at 21s. 6d. are now at their highest for the year; lowest level in 1950 was 19s. Boake Roberts, now 33s., were, at one time, down to 25s. 6d. Albright & Wilson have moved between 31s. 10½d. and 27s. 10½d. in 1950 and are now 30s. 9d. F. W. Berk 2s. 6½d. shares, now at 12s. 6d., have had highest and lowest levels of 12s. 10½d. and 8s. 10½d. during the year.

Glaxo Laboratories 10s. shares, now at 59s. 3d. are closing 1950 at around the year's highest. Turner & Newall, now at 85s. 9d., have had extremes of 87s. and 73s. 3d. in the past 12 months; the shares have recently been active on the increased profits and higher payment to shareholders.

In the case of Boots Drug, which were 50s. 3d. a year ago and are now 48s. 9d., extremes have ranged from 51s. 3d. to 44s. 4½d. in the past 12 months. The 4s. units of the Distillers Co. at 19s. 4½d. are not far short of the year's highest; at one time they were 16s. 6d. Lever & Unilever's extremes during the year were 44s. 6d. and 37s. 9d., the current price of 41s. 9d. compares with 44s. 3d. a year ago.

Oil shares are tending to improve in response to market talk of higher dividend possibilities. Shell, now at 68s. 1½d. were 66s. 3d. a year ago; their extreme levels in the year were 70s. 3d. and 59s. 3d.

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## Training Chemical Engineers

A LETTER recently received from Mr. Morris W. Rakestraw, Editor of the American *Journal of Chemical Education*, has expressed interest in the leader "Training Chemical Engineers," which appeared in THE CHEMICAL AGE issue of 11 November 1950.

Mr. Rakestraw is helping to organise the programme of the International Congress of Pure and Applied Chemistry, which is to be held in New York, next September. He wishes to contact anyone in Great Britain who would like to take part in the Congress and discuss the training of chemical engineers in Great Britain.

Any readers who are interested and who might like to attend the Congress are invited to write to the Editor of THE CHEMICAL AGE.

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## European Atomic Plant

A scheme for the construction of a European laboratory for peaceful atomic research is to be considered by the Council of Europe. It is proposed that the laboratory, which would probably be located in France, should be centred on a cosmotron equal or superior in power to that now being built at Brookhaven, U.S.A.

# Patent Processes in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patents Office, Southampton Buildings, London, W.C.2, at 2s. each. Higher priced photostat copies are generally available.

## Complete Specifications Accepted

Process for the production of sulphonamides.—Ward, Blenkinsop & Co. Ltd., A. A. Goldberg and L. W. F. Salame. Feb. 10 1949. 648,467.

Production of fat-soluble vitamin concentrates.—Nopco Chemical Co. Feb. 17 1948. 648,649.

Production of porous metal plates.—Mond Nickel Co., Ltd., and M. A. Comley. March 21 1949. 648,415.

Recovery of insoluble solids from waste liquors.—Baker Platinum, Ltd., and I. Morgan. April 5 1949. 648,417.

Ferrous alloy having a high mechanical resistance at high temperatures.—Soc. Anon. Des Etablissements J. Holtzer. April 30, 1948. 648,422.

Production of organo-polysiloxanes.—Soc. Des Usines Chimiques Rhone-Poulenc. June 15 1948. 648,478.

Process of preparing organosiloxanes.—Dow Corning Corporation. June 22 1948. 648,480.

Production of alkylated alkylol melamines.—British Industrial Plastics, Ltd. June 24 1948. 648,481.

Aluminium solder and a method for the production thereof.—V. Tissot-Dagnette. June 28 1948. 648,482.

Apparatus for use in detecting the turbidity of liquids.—Permutit Co., Ltd. (Permutit Co.). June 29 1948. 648,485.

Plastic compositions, sheet materials made therefrom and processes for making such sheet materials.—E. I. Du Pont De Nemours & Co. June 30 1948. 648,485.

Production of ferric oxide.—General Electric Co., Ltd., D. M. Dovey, R. C. Chirnside and H. P. Rooksby. July 28 1949. 648,494.

Production of polyesters.—Courtaulds, Ltd., A. S. Carpenter, F. Reeder and E. R. Wallsgrove. Oct. 12 1949. 648.513.

Compositions having fungicidal and/or fungistatic properties.—Scientific Oil Compounding Co., Inc. Nov. 5 1948. 648,518.

Germanium rectifiers. — Westinghouse Brake & Signal Co., Ltd., A. Jenkins and K. A. Garrod. Oct. 27 1949. 648,186.

Contacting finely divided solids with gases.—Standard Oil Development Co. Dec. 14 1948. 648,198.

Treatment of metal sulphates.—J. A. Reavell. Aug. 19 1949. 648,528.

Vitreous seals, particularly among glasses, ceramics, refractories and metals. —S. H. Parsonage. Dec. 21 1949. 648,239.

Method of and apparatus for, carrying out chemical reactions.—Compagnie Francaise de Raffinage. Dec. 7 1945. 647,705.

Heat-treatment of cobalt-chromium-nickel-base alloys.—Elgin National Watch Co. May 17 1946. 647,760.

Process and apparatus for the manufacture of multicellular glass.—Soc. Anon. des Manufactures des Glaces et Produits Chimiques de St.-Gobain, Chauny, & Cirey. Aug. 1 1946. 647,763.

Waterproof coatings.—Soc. des Usines Chimiques Rhone-Poulenc. Oct. 4 1946. 647,713.

Hydrophilic sheet materials impregnated with a combined plasticiser and fire-retardant and method of producing the same.—G. F. Rayner (American Viscose Corporation). Oct. 16 1946. 647,582.

Methods of imparting fluorescent effects to materials.—Lever Bros. & Unilever, Ltd., L. N. Savidge and R. Thomas. March 25 1948. 647,718.

Methods for producing articles sheathed with thermoplastic material.—Extruded Plastics, Inc. May 7 1947. 647,644.

Electrolytic production of chlorates.—Pennsylvania Salt Manufacturing Co. May 20 1947. 647,719.

Degreasing, pickling, and passivation of metals.—H. M. Freud. June 24 1947. 647,782.

Manufacture of refractory products and abrasives. — Electro-refractaire. July 8 1947. 647,721.

Extraction of vanadium and phosphorus from salt residues.—Montecatini Soc. Generale per l'Industria Mineraria E. Chimico. July 21 1947. 647,588.

Thermoplastic polymers.—British Celanese, Ltd. Aug. 12 1947. 647,727.

Polymerisation of dienes.—B. F. Goodrich Co. Aug. 26 1947. 647,729.

Means for controlling the temperature of hot gases.—J. Lucas, Ltd., R. J. Ifield, and J. J. Righton. Oct. 1 1948. 647,648.

Cracking or otherwise treating hydrocarbons.—Houdry Process Corporation. Oct. 21 1947. 647,591.

Means for controlling the temperature of hot gases in combustion-chambers.—J. Lucas, Ltd., and E. A. Watson. Oct. 13 1948. 647,830.

Manufacture of chlorinated rubber.—Dunlop Rubber Co., Ltd., M. Gordon, and R. M. Everett. Oct. 27 1948. 647,732.

Reactivation of spent media from the purification of liquids with activated magnesia.—J. J. Naugle. Nov. 7 1947. 647,734.

Process for the adherence of aluminium and other metallic coatings to metallic surfaces.—W. P. Williams (Armco International Corporation). Dec. 8 1947. 647,652.

Apparatus for detecting or registering chemical characteristics of liquids.—Wallace & Tiernan Products, Inc. Dec. 11 1947. 647,739.

Electrical cell apparatus for detecting chemical characteristics of liquids.—Wallace & Tiernan Products, Inc. Dec. 15 1947. 647,740.

Process and apparatus for the manufacture of ammonium sulphate crystals.—C. Otto. Dec. 17 1947. 647,742.

Purification of gaseous mixtures and apparatus therefor.—Elliott Co. Dec 19 1947. 647,654.

Manufacture of glue.—E. Kolle. Dec. 24 1947. 647,796.

Process for heat-treating ferrous metals and products obtained therefrom.—L. Levitsky. Dec. 24 1947. 647,797.

Process for the direct manufacture of concentrated nitric acid from the gases of the combustion of ammonia.—P. Guareschi, L. Pettenati, and G. Maragliano. Dec. 31 1947. 647,594.

Basic alkyl esters and the preparation thereof.—F. F. Blickie. Feb. 28 1948. 647,846.

# CLASSIFIED ADVERTISEMENTS

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## PATENTS & TRADE MARKS

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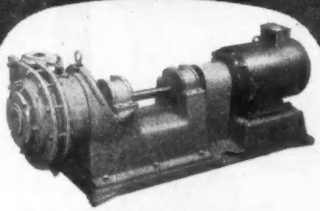

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